HIGHLIGHTS

REVISION NO. 33 Jun 01/10

Pages which have been revised are outlined below, together with the Highlights of the Revision

CH/SE/SU PAGES	C	REASON FOR CHANGE	EFFECTIVITY
CHAPTER 36			
L.E.P. 1- 5		Revised to Reflect this revision indicating new,revised, and/or deleted pages	
T. OF C. 1		Revised to reflect this revision	
36-11-00 01 12, 15, 18, 23- 24, 49- 53		Minor additions and amplification **CORRECTED TAG OF WARNINGS**	
36-11-00 02 12- 13, 19, 24, 27- 28		Minor additions and amplification **CORRECTED TAG OF WARNING**	
36-11-00 02 430- 434, 437- 439		Minor additions and amplification	
36-11-00 02 607- 613, 615		Minor, non technical corrections **REVISED STEP** Minor additions and amplification **ADDED INSPECTION CRITERIA FOR THE 14TH STAGE MANIFOLD ALIGNMENT CHECK**	
36-11-16 02 601		Minor additions and amplification **ADDED TERM "CLEANING AGENT"**	
36-11-16 03 601, 604, 607		Minor additions and amplification **ADDED TERM "CLEANING AGENT"**	
36-11-16 01 901, 903- 904		Minor additions and amplification **ADDED LOCKWIRE REMOVAL**	
36-11-16 02		Minor additions and amplification	

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CH/SE/SU C PAGES	REASON FOR CHANGE	EFFECTIVITY
904- 905	ADDED LOCKWIRE REMOVAL	
36-12-00	Minor additions and amplification	
402, 405, 415, 421, 423- 426	REVISED STEP NUMBERING	

CHAPTER 36

PNEUMATIC

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively
Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary

CH/SE/SU	C	PAGE	DATE
RECORD			
OF TEMP.			
REVISION			
L.E.P.	R	1- 5	Jun01/10
T. of C.	R	1	Jun01/10
T. of C.		2	Jun01/08
T. of C.		3	Jun01/08
T. of C.		4	Jun01/08
T. of C.		5	Jun01/08
T. of C.		6	Jun01/09
T. of C.		7	Jun01/09
36-00-00		1	Jun01/05
36-00-00		2	Jun01/05
36-00-00		3	Jun01/05
36-00-00		4	Jun01/05
36-00-00		5	Dec01/90
36-00-00		6	Dec01/90
36-00-00		7	Jun01/04
36-00-00		8	Jun01/04
36-00-00		9	Jun01/04
36-00-00		10	Jun01/04
36-00-00		11	Jun01/04
36-00-00		12	Jun01/04
36-00-00		13	Jun01/04
36-00-00		14	Jun01/04
36-00-00		15	Jun01/04
36-00-00		16	Jun01/04
36-00-00		17	Jun01/04
36-00-00		18	Jun01/04
36-00-00		19	Jun01/04
36-00-00		20	Jun01/04
36-00-00		21	Jun01/04
36-00-00		22	Jun01/04
36-00-00		23	Jun01/04
36-00-00		24	Jun01/04
36-00-00		25	Jun01/04
36-00-00		26	Jun01/04
36-10-00		1	Jun01/05
36-10-00		2	Dec01/90

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36-10-00		3	Jun01/05
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36-10-00		6	Jun01/05
36-10-00		7	Jun01/04
36-10-00		8	Jun01/04
36-10-00		9	Jun01/04
36-11-00 01		1	Jun01/08
36-11-00 01		2	Jun01/08
36-11-00 01		3	Jun01/04
36-11-00 01		4	Jun01/04
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36-11-00 01		6	Jun01/08
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36-11-00 01		8	Jun01/08
36-11-00 01		9	Jun01/08
36-11-00 01		10	Jun01/08
36-11-00 01		11	Jun01/08
36-11-00 01	R	12	Jun01/10
36-11-00 01		13	Jun01/08
36-11-00 01		14	Jun01/08
36-11-00 01	R	15	Jun01/10
36-11-00 01		16	Jun01/08
36-11-00 01		17	Jun01/08
36-11-00 01	R	18	Jun01/10
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36-11-00 01		22	Jun01/08
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36-11-00 01		29	Jun01/08
36-11-00 01		30	Jun01/08
36-11-00 01		31	Jun01/08
36-11-00 01		32	Jun01/08
36-11-00 01		33	Jun01/08
36-11-00 01		34	Jun01/08

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36-11-00 01		35	Jun01/08
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36-11-00 01		41	Jun01/08
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36-11-00 02		15	Jun01/04
36-11-00 02		16	Jun01/04

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36-11-00 02		505	Dec01/06
36-11-00 02		506	Jun01/04

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(LEAK lt. on AIR BLEED panel)				
Deactivation			901	ALL
Ref. : MEL Sect. 1-36, Item 22			903	ALL
(Wing leak detection loops)			903	ALL
Deactivation			903	ALL
Reactivation			908	ALL
OVERHEAT DETECTION CONTROLLER	36-22-11			
Removal/Installation			401	ALL
OVERHEAT SENSING ELEMENT	36-22-12			
Removal/Installation			401	ALL

Printed in France

1. General

A. Definition

The term "pneumatic" covers all the systems designed to supply air to the various aircraft systems or zones or engines, together with associated control, monitoring and indicating components.

B. Function

The main pneumatic system is designed to supply high pressure air to the following systems :

. conditioning and pressurization of the pressurized zones ;
. wing ice protection (Ref. 30-11-00) ;
. engine starting (Ref. 80-00-00) ;
. pressurized water system (Ref. 38-42-00) ;
. hydraulic tank (reservoir) pressurizing system (Ref. 29-14-00) ;

**ON A/C 001-100,

. throttle control heating system (Ref. 76-11-00)
. the thrust reverser (Ref. 78-30-00)

**ON A/C ALL

Compressed air is supplied from the following sources :

. different stages of engine HP compressor ;
. auxiliary power unit (APU) compressor ;
. one or several HP ground air supply units.

Two independent systems bleed air directly from each engine to supply :

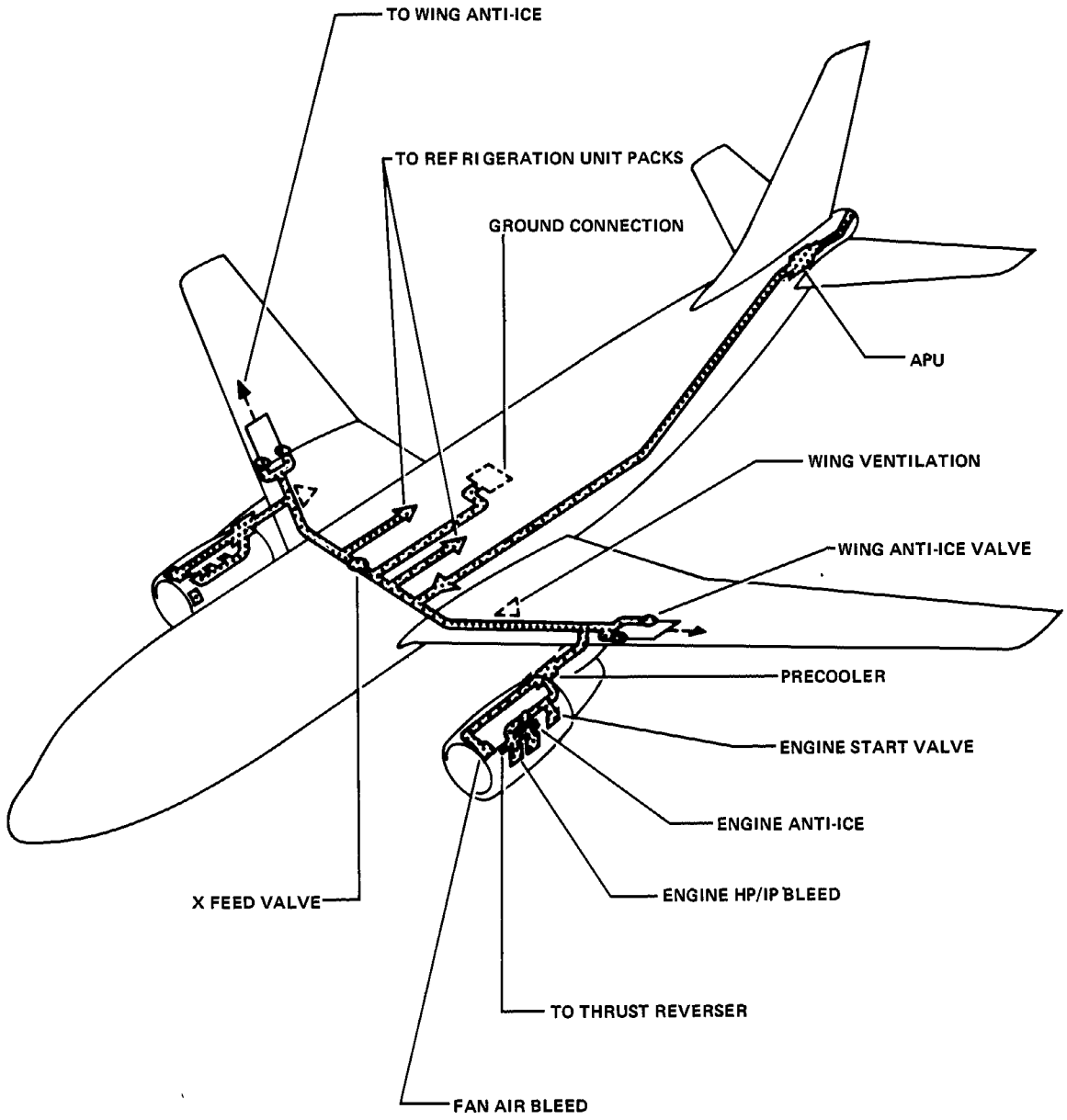
**ON A/C 101-200,

. the thrust reverser (Ref. 78-30-00)

**ON A/C ALL

. the engine air intake ice protection (Ref. 30-21-00) and when required, engine anti-icing systems (Ref. 75-10-00 and 75-11-00).

These various systems incorporate special features ensuring their safe operation ; significant failures are indicated on CAPT and F/O main instrument panels 3VU and 5VU located on the front panel.
Due to FFCC design of the flight compartment and the use of illuminated pushbutton switches, the main control, monitoring and indicating components of the systems are grouped on the overhead panel, located above pilots' heads while less important monitoring and/or maintenance components are grouped on the maintenance panel.
Two cathode ray tubes provide warning and system displays to facilitate fault analysis and system operation (left and right ECAM display units). (Ref. Fig. 001)



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Air Supply System
Figure 001

C. Summary Description

The main pneumatic system includes :

- The air supply and distribution system (Ref. 36-10-00) which comprises :
  . APU and engine bleed air supply systems,
  . features enabling crossfeed of these air bleed systems,
  . the device enabling supply of the distribution system through HP ground air supply units together with the control, protection and indicating components associated with each system.
- A totally independent system which provides ventilation (ram air) of the wing leading edges, between the nacelle and the fuselage in order to avoid excessive temperatures in flight in the vicinity of ducting.
- A monitoring and detection system (Ref. 36-20-00) providing :
  . pressure and temperature indications for air supplied by the pneumatic system,
  . protection against overheat due to possible leakage around the hot air ducts.

For the pneumatic system :

- On the overhead panel : controls and indicators are located on the bottom right side, under the heading : AIR BLEED (panel 436VU).
- On the maintenance panel, indications are grouped towards the center of the panel under the heading : AIR BLEED & COMPT TEMP (section of panel 471VU).

(Ref. Fig. 002)

**ON A/C 101-200,

(Ref. Fig. 003)

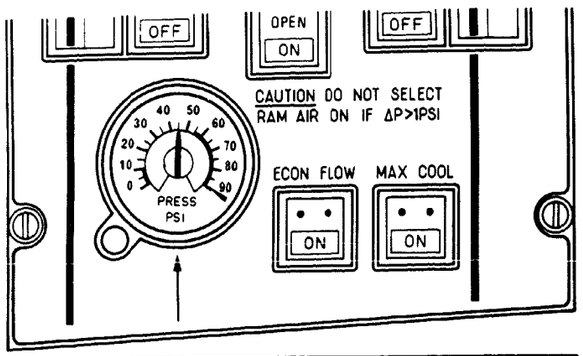
**ON A/C 001-100,

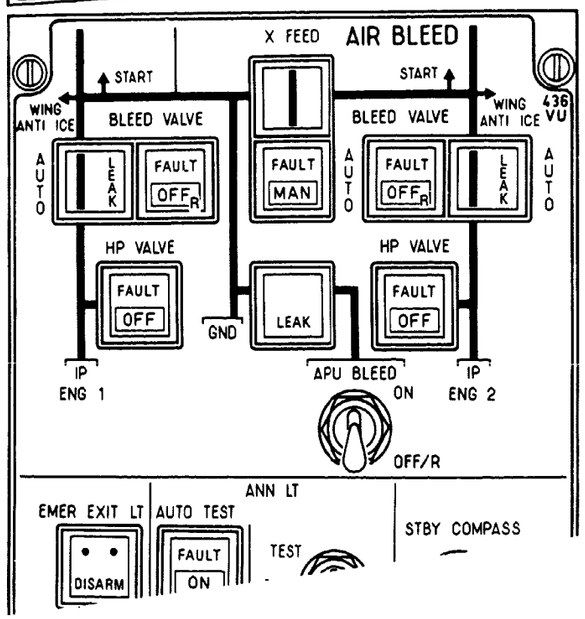
(Ref. Fig. 004)

**ON A/C ALL

(Ref. Fig. 005, 006, 007)
(Ref. Fig. 008)
(Ref. Fig. 009)
(Ref. Fig. 010, 011, 012)
(Ref. Fig. 012)

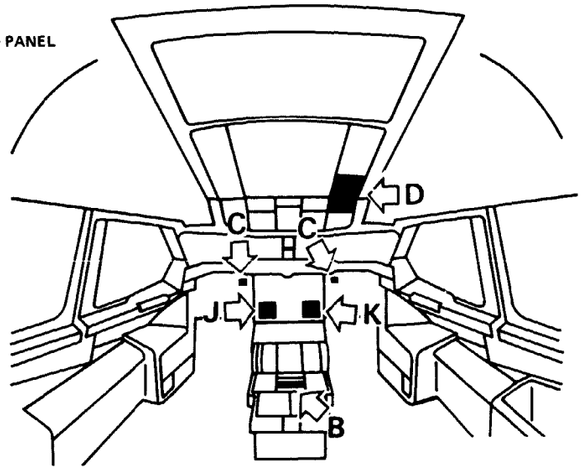
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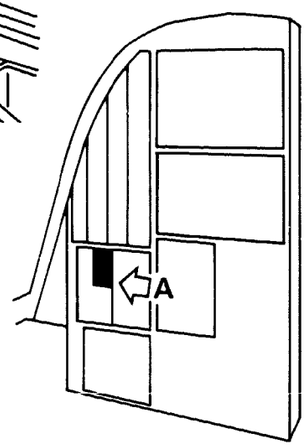




AIR BLEED PANEL

D



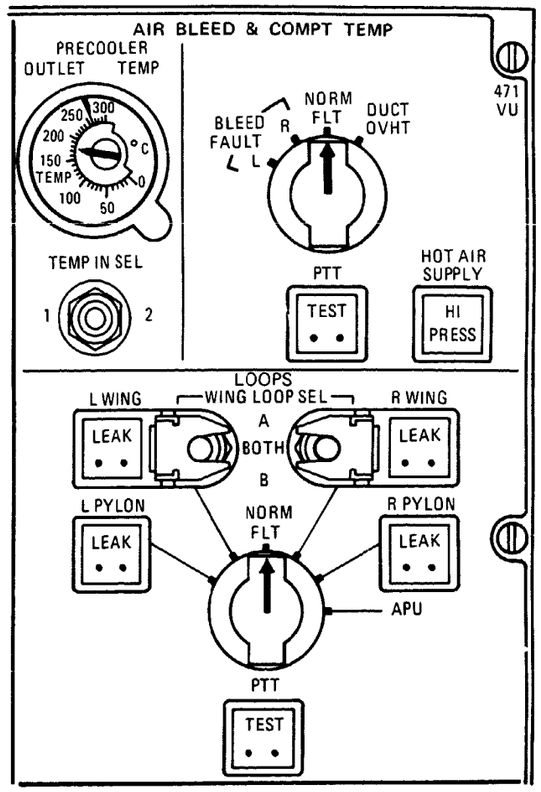


J WARNING DISPLAY

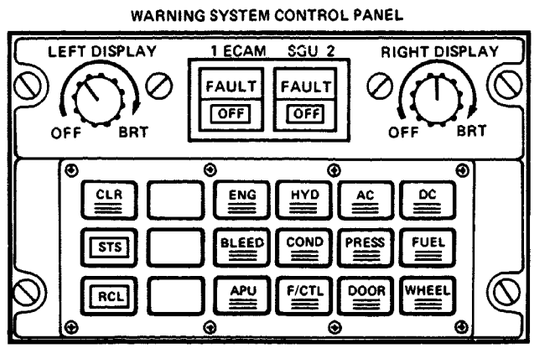
K SYSTEM DISPLAY

FOR THE DETAIL OF ECAM,
REFER TO SDN ECAM
GENERAL DATA 31 - 51

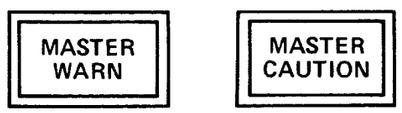
A



B

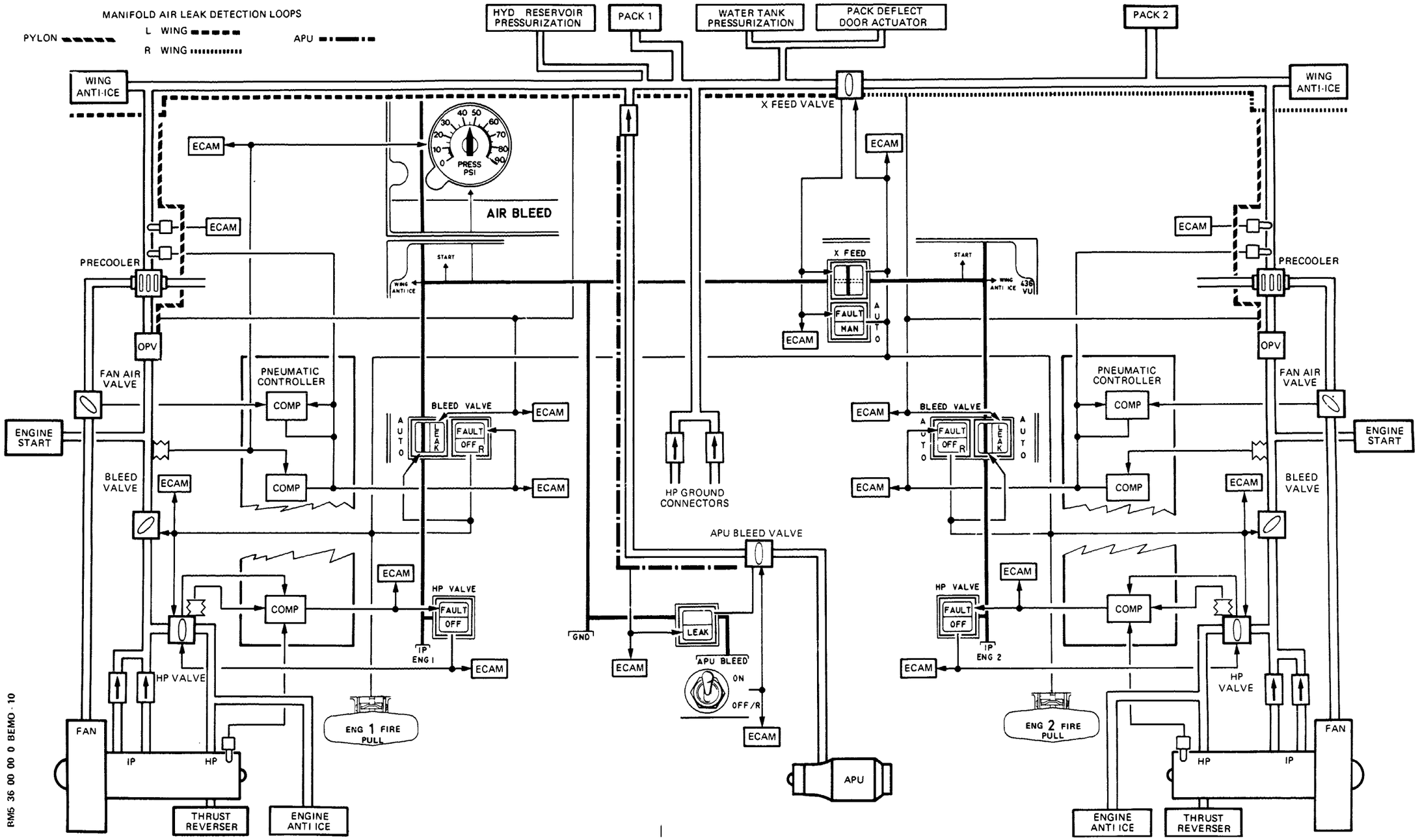


C

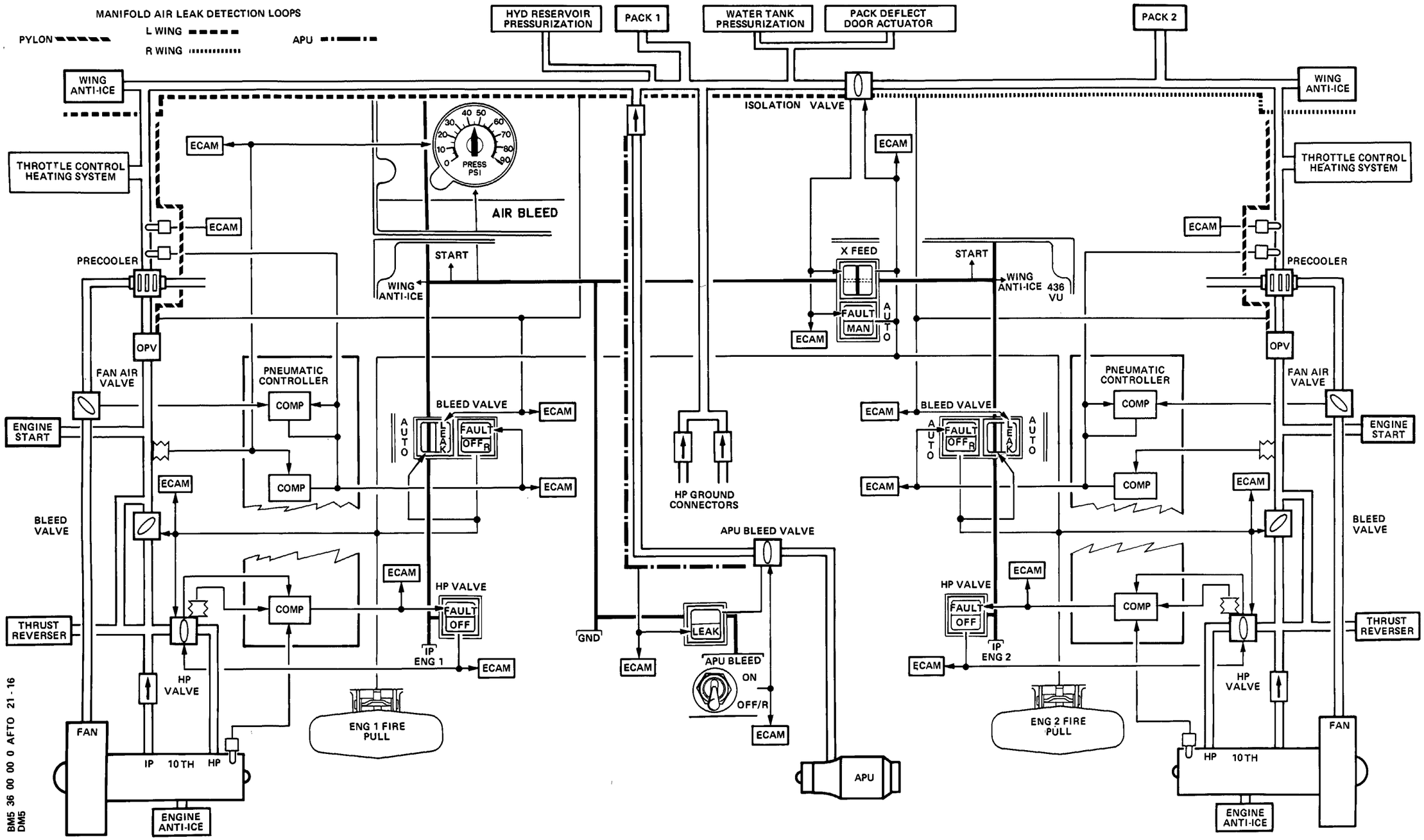


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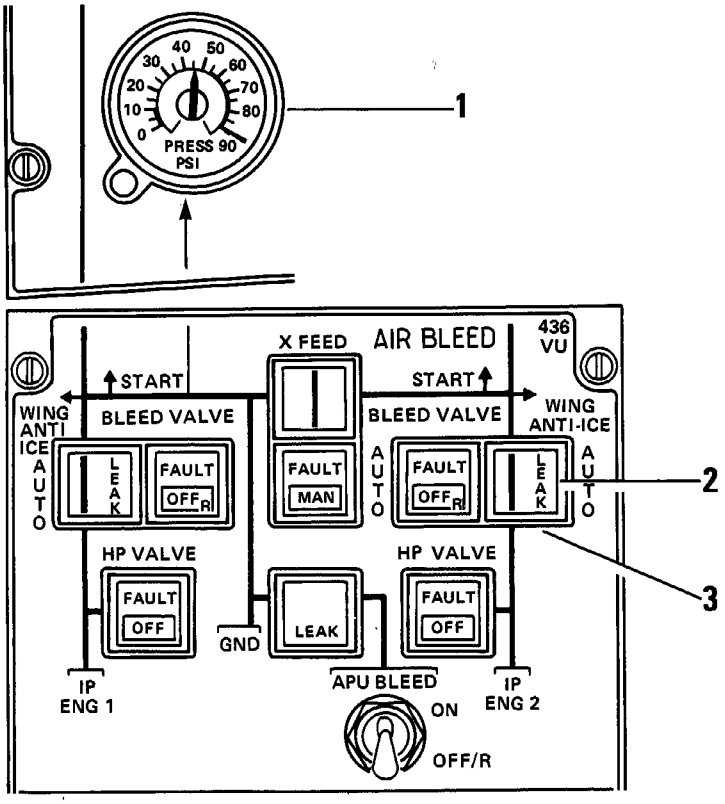
AIR BLEED Panel Location
Figure 002



Pneumatic - General Schematic
Figure 003



Pneumatic - General Schematic
Figure 004



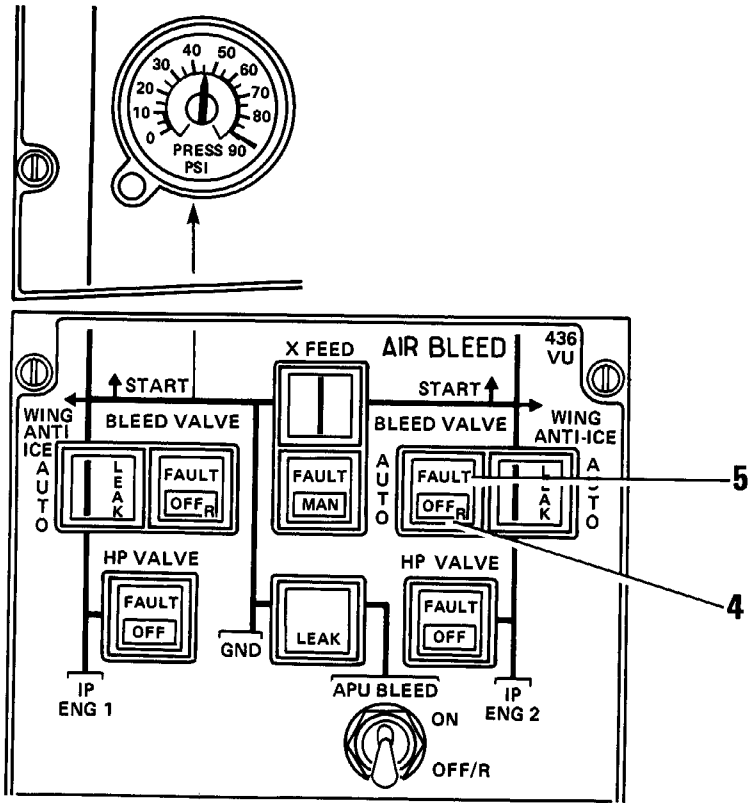
1 – AIR BLEED / PRESS INDICATOR : READS THE PNEUMATIC PRESSURE AT THE LEFT BLEED VALVE OUTLET. THE NORMAL OPERATING PRESSURE RANGES BETWEEN 15 AND 50 PSIG.

2 – LEAK LEGEND OF BLEED VALVE ANNUNCIATOR : LEGEND COMES ON AMBER TOGETHER WITH AIR WARNING LIGHT ON THE WARNING LIGHT DISPLAY PANEL ACCOMPANIED BY THE SINGLE CHIME WHEN AMBIENT OVERHEAT IS DETECTED IN ENGINE BLEED AIR DUCTS SURROUNDING AREA. THE APPROPRIATE BLEED VALVE, THE APU BLEED VALVE AND THE CROSSFEED VALVE CLOSE (IF OPEN).

3 – FLOWBAR OF BLEED VALVE ANNUNCIATOR
ON : VALVE IS OPEN
OFF : VALVE IS CLOSED

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AIR BLEED Panel - BLEED VALVE Indicating
Figure 005



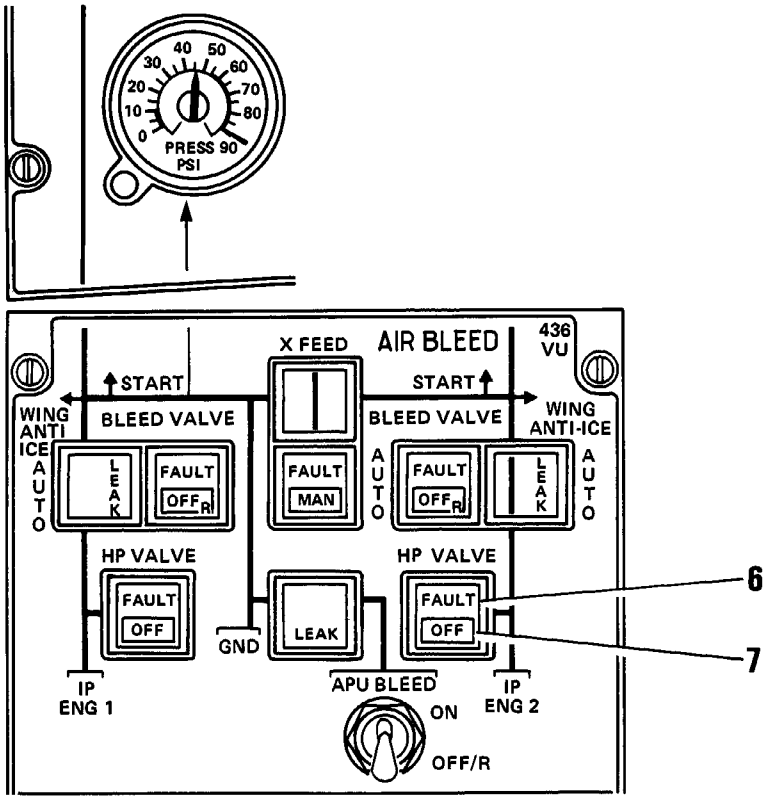
4 – BLEED VALVE PUSHBUTTON SWITCH
- WHEN PRESSED (IN) (AUTO) : VALVE OPENS AND REGULATES PRESSURE IF APU BLEED SWITCH IS IN OFF/R POSITION. THE BLEED VALVE CLOSES AUTOMATICALLY (ELECTRICALLY CONTROLLED) IN CASE OF LEAKAGE OR FAILURE (ILLUMINATION OF LEAK OR FAULT LEGENDS) OR IF ENG FIRE HANDLE IS PULLED.
- WHEN RELEASED (OUT) (OFF/R) : THE BLEED VALVE AND HP VALVE ARE CLOSED AND THE SAFETY SYSTEM IS RESET.

5 – FAULT LEGEND OF BLEED VALVE PUSHBUTTON SWITCH : LEGEND COMES ON AMBER TOGETHER WITH AIR WARNING LIGHT ON THE WARNING LIGHT DISPLAY PANEL AND THE SINGLE CHIME IS ACTIVATED WHEN :
- OVERHEAT IS DETECTED AT THE PRECOOLER OUTLET
- PNEUMATIC CONTROLLER MONITOR POWER SUPPLY IS ON AND CONTROL POWER SUPPLY IS OFF
- CONTROLLER BITE TEST SELECTOR SWITCH IS NOT IN FLIGHT POSITION
- BLEED VALVE TEMPERATURE OR PRESSURE REGULATION FAILS
- FAN AIR VALVE LIMIT SWITCHES HAVE FAILED (FULLY CLOSED OR FULLY OPEN).

IF BLEED VALVE PUSHBUTTON SWITCH IS PRESSED (IN) (AUTO), THE BLEED VALVE CLOSES AUTOMATICALLY (ELECTRICALLY CONTROLLED). FAULT LEGEND REMAINS ON AS LONG AS THE OVERHEAT CONDITION PREVAILS.

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AIR BLEED Panel - BLEED VALVE Control
Figure 006



6 – FAULT LEGEND OF HP VALVE PUSHBUTTON SWITCH : LEGEND COMES ON AMBER TOGETHER WITH AIR WARNING LIGHT ON THE WARNING LIGHT DISPLAY PANEL ACCOMPANIED BY THE SINGLE CHIME WHEN :
- HP VALVE OR TEMPERATURE SENSOR FAILS,
- HP VALVE OPENING SUPPLY SIGNAL IS NOT AUTOMATICALLY CUT OFF WHEN PE AND TE ARE EXCESSIVE : HP VALVE DOES NOT AUTOMATICALLY CLOSE AFTER ILLUMINATION OF FAULT LEGEND.

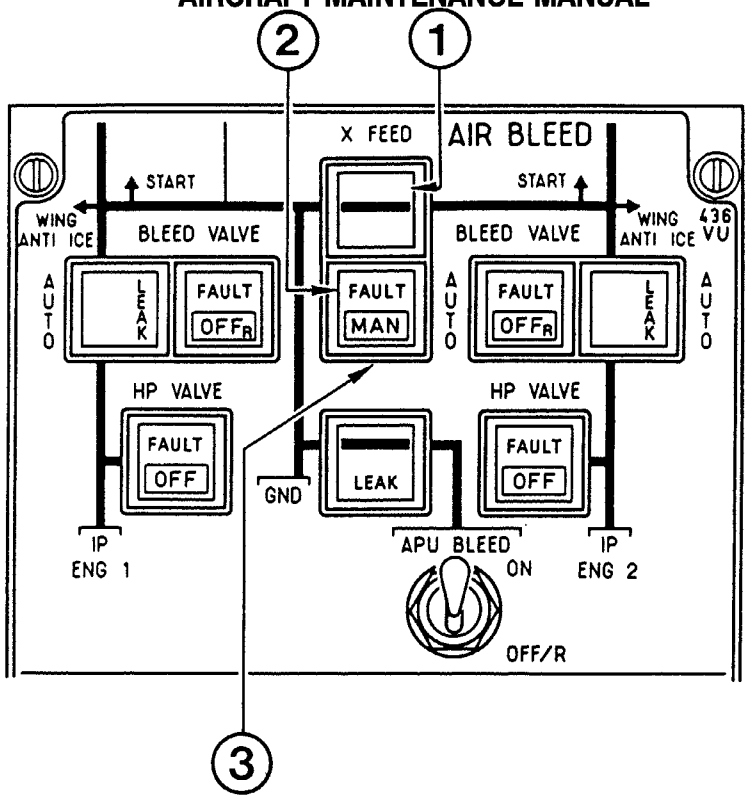
7 – HP VALVE PUSHBUTTON SWITCH
- WHEN SWITCH IS PRESSED (IN), THE HP VALVE IS OPEN AS LONG AS :
  - HP PRESSURE IS LOWER THAN :
    86 PSIG (WING ICE PROTECTION OFF)
    141 PSIG (WING ICE PROTECTION ON)
  - HP TEMPERATURE IS LOWER THAN 378°C (PW ENGINE), 393°C (GE ENGINE) OR PRESSURE LOWER THAN 73 PSIG (ELECTRICAL SUPPLY CUT OFF).

VALVE PNEUMATIC CONTROL

THE HP VALVE WILL AUTOMATICALLY CLOSE WHEN :
- BLEED VALVE PUSHBUTTON SWITCH IS RELEASED (OUT) (OFF/R)
- ENG FIRE HANDLE IS PULLED.
- WHEN SWITCH IS RELEASED (OUT) (OFF), THE HP VALVE IS CLOSED.

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AIR BLEED Panel - HP VALVE Control and Indicating
Figure 007



1 – X FEED VALVE POSITION PUSHBUTTON SWITCH
IN LINE : THE VALVE IS OPEN
CROSS LINE : THE VALVE IS CLOSED
- WHEN X FEED MODE PUSHBUTTON SWITCH IS PRESSED (IN), X FEED VALVE POSITION PUSHBUTTON SWITCH IS INOPERATIVE.
- WHEN X FEED MODE PUSHBUTTON SWITCH IS RELEASED (OUT) (MAN LEGEND ON) :
  - X FEED VALVE POSITION PUSHBUTTON SWITCH PRESSED (IN) = VALVE IS OPEN
  - X FEED VALVE POSITION PUSHBUTTON SWITCH RELEASED (OUT) = VALVE IS CLOSED.

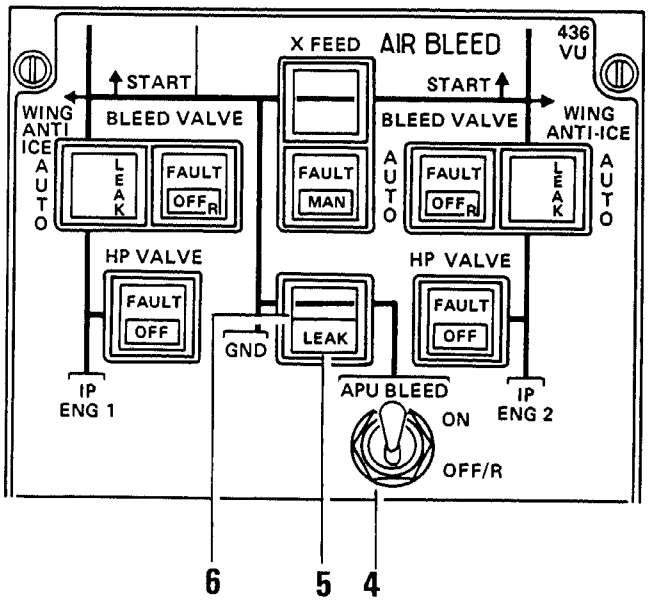
2 – FAULT LEGEND OF X FEED MODE PUSHBUTTON SWITCH COMES ON AMBER TOGETHER WITH AIR WARNING LIGHT ON THE WARNING LIGHT DISPLAY PANEL ACCOMPANIED BY THE SINGLE CHIME WHEN CROSSFEED VALVE POSITION DISAGREES WITH AUTOMATIC SELECTED POSITION.
NOTE : FAULT LEGEND COMES ON WITHOUT AIR WARNING LIGHT AND SINGLE CHIME DURING VALVE TRANSIT IN AUTOMATIC MODE.

3 – X FEED MODE PUSHBUTTON SWITCH
- PRESSED (IN) (AUTO) = NORMAL POSITION. VALVE OPENS OR CLOSES AND IS ACTUATED BY ELECTRIC MOTOR No. 1, DEPENDING ON APU BLEED VALVE POSITION (OPEN OR CLOSED).
- RELEASED (OUT) : MAN LEGEND ON, CROSSFEED VALVE IS ACTUATED BY ELECTRIC MOTOR No. 2 WHEN X FEED VALVE POSITION PUSHBUTTON SWITCH IS PRESSED (IN) OR RELEASED (OUT).

NOTE : a) IN AUTO MODE (X FEED MODE P/BSW PRESSED (IN)) THE CROSSFEED VALVE WILL AUTOMATICALLY CLOSE IF :
– ENG 1 OR ENG 2 FIRE HANDLE IS PULLED
– OVERHEAT IS DETECTED (LEAK LEGEND) (EXCEPT DURING ENGINE START SEQUENCE).
b) IN MAN MODE (X FEED MODE P/BSW RELEASED (OUT)) THE CROSSFEED VALVE WILL NOT AUTOMATICALLY CLOSE IF :
– ENG 1 OR ENG 2 FIRE HANDLE IS PULLED
– OVERHEAT IS DETECTED (LEAK LEGEND) (EXCEPT DURING ENGINE START SEQUENCE).

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AIR BLEED Panel - X FEED Control and Indicating
Figure 008



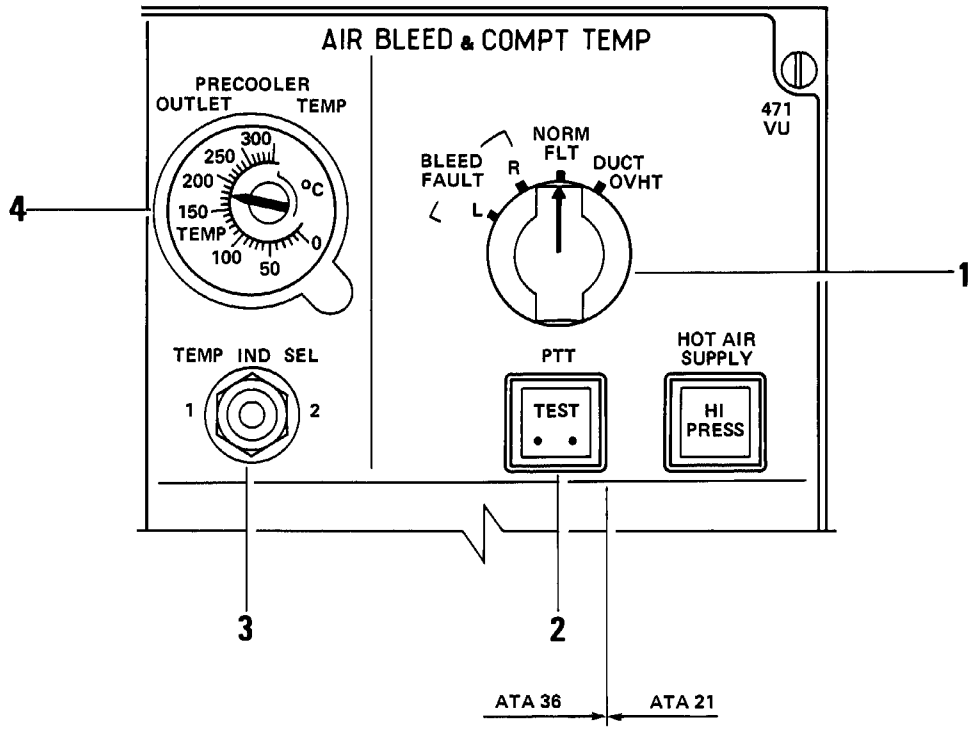
4 – APU BLEED SWITCH :
. ON POSITION : ENGINES 1 AND 2 BLEED VALVES CLOSE.
. CROSSFEED VALVE OPENS (IF SELECTED AUTO)
. APU BLEED VALVE OPENS IF APU MASTER SWITCH IS PLACED IN ON POSITION AND APU RPM HAS INCREASED UP TO 95%.
THE VALVE WILL AUTOMATICALLY CLOSE IF A LEAK LEGEND COMES ON (EXCEPT DURING ENGINE START SEQUENCE).
. OFF/R POSITION : APU BLEED VALVE CLOSES AND THE AUTOMATIC MONITORING SYSTEM IS RESET.

5 – LEAK LEGEND OF APU BLEED ANNUNCIATOR COMES ON AMBER TOGETHER WITH MASTER CAUTION WARNING LIGHT ON CAPT AND F/O MAIN INSTRUMENT PANELS 3VU AND 5VU AND THE SINGLE CHIME SOUNDS WHEN AMBIENT OVERHEAT IS DETECTED IN APU DUCT SURROUNDING AREA.

6 – FLOWBAR OF APU BLEED ANNUNCIATOR
ON : VALVE OPEN
OFF : VALVE CLOSED

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AIR BLEED Panel - APU BLEED Control and Indicating
Figure 009



1 – AIR BLEED & COMPT TEMP TEST SELECTOR SWITCH SELECTS L OR R BLEED FAULT WARNING CIRCUITS TO BE TESTED.

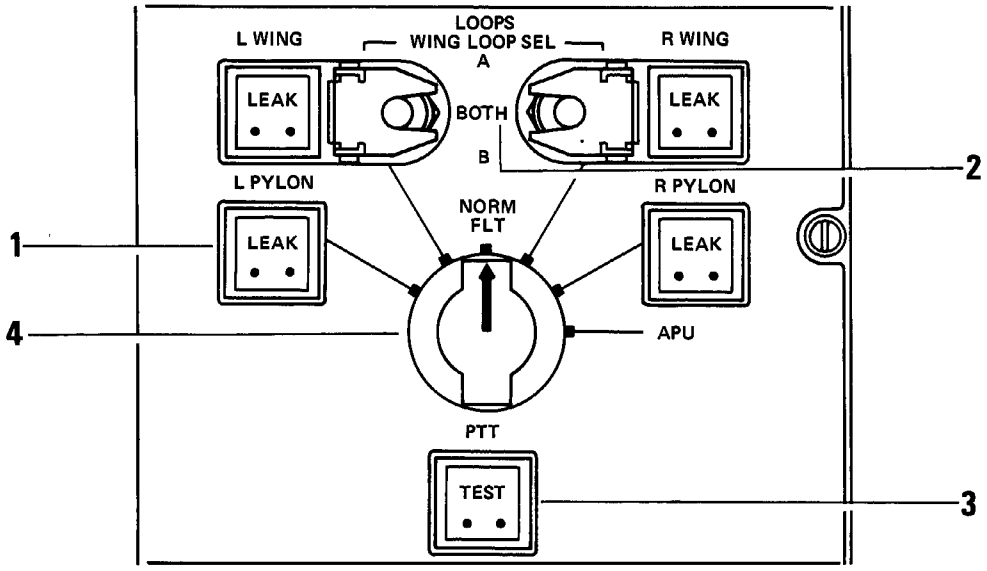
2 – PTT PUSHBUTTON SWITCH WHEN PRESSED (IN), ENABLES TO TEST CONTINUITY OF THE SELECTED BLEED FAULT WARNING CIRCUITS. AFTER THE TEST, THE CORRESPONDING BLEED VALVE PUSHBUTTON SWITCH MUST BE RELEASED (OUT) (OFF/R) TO RESET THE CIRCUITS.

3 – TEMP IND SEL SWITCH SELECTS LEFT (1) OR RIGHT (2) PRECOOLER OUTLET TEMPERATURE.

4 – PRECOOLER OUTLET TEMP INDICATOR READS THE TEMPERATURE AT THE SELECTED PRECOOLER OUTLET. NORMAL OPERATING TEMPERATURE RANGES BETWEEN 160°C AND 240°C.

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Air Bleed - Monitoring and BLEED FAULT Test
Figure 010



1 – L (R) WING / LEAK OR L (R) PYLON / LEAK MEMORIZED FAULT ANNUNCIATOR (MFA) : COMES ON WHITE WHEN THE CORRESPONDING OVERHEAT (LEAK) IS DETECTED. ANNUNCIATOR REMAINS ON AFTER OVERHEAT HAS DISAPPEARED TO FACILITATE FAULT ISOLATION.

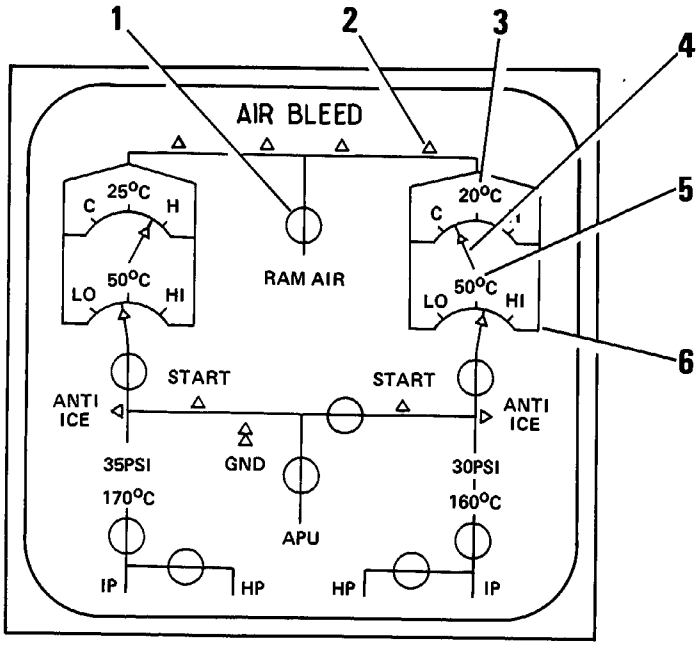
2 – WING LOOP SEL SWITCH : DURING THE GROUND TEST, ENABLES TO SELECT THE WING LOOPS, ON EACH SIDE, TO BE TESTED. IF ONE LOOP IS INOPERATIVE, IT MUST BE ISOLATED BY SELECTING THE OTHER.

3 – PTT PUSHBUTTON SWITCH : WHEN PRESSED (IN), ENABLES TO TEST THE CONTINUITY OF THE SELECTED LOOP AND LEAK WARNING ELECTRICAL CIRCUIT.
AFTER THE TEST, THE CORRESPONDING VALVE PUSHBUTTON SWITCHES ON OVERHEAD PANEL MUST BE RELEASED (OUT) (OFF/R) TO RESET THE CIRCUITS.

4 – LOOP TEST SELECTOR SWITCH : SELECTS THE LOOP TO BE TESTED WHEN THE PUSHBUTTON SWITCH IS PRESSED (IN). AFTER THE TEST, THE SELECTOR SWITCH MUST BE PLACED IN NORM FLT POSITION.

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Manifold Air Leak Test
Figure 011



1- RAM AIR INLET VALVE

(G) : VALVE OPEN .

(G) : VALVE CLOSED

2- COLD AIR DUCT SUPPLY (G)

(A) WHEN NO COLD AIR IS SUPPLIED

3- PACK DISCHARGE TEMPERATURE (G)

(A) WHEN $t^{o} \leqslant -18^{o}$ C

4- PACK TEMPERATURE CONTROL VALVE (G)

C - COLD, VALVE CLOSED
H - HOT, VALVE FULLY OPEN

5- TURBINE INLET TEMPERATURE (G)

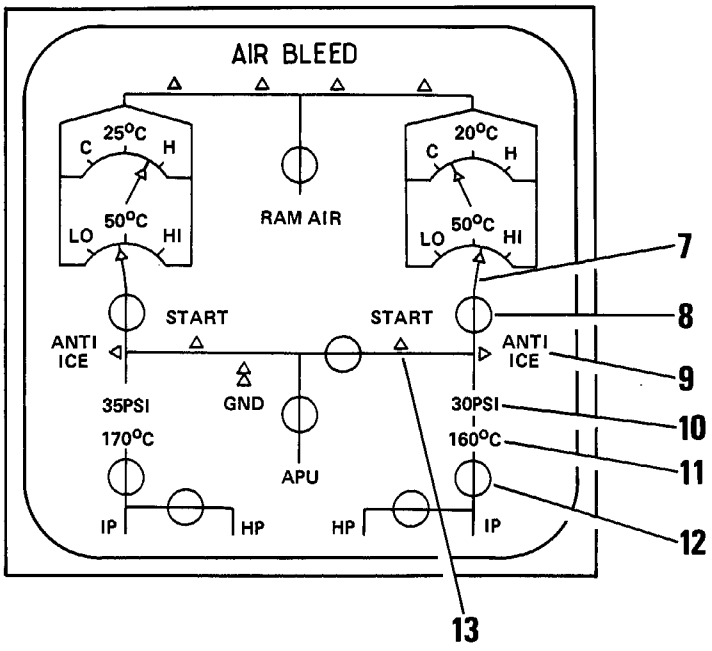
(A) WHEN $t^{o} \geqslant 120^{o}$ C
FLASHES WHEN $t^{o} \geqslant 95^{o}$ C AND $\leqslant 120^{o}$ C

6- PACK SYMBOL (W)

(A) WHEN PACK INOPERATIVE, PACK VALVE CLOSED

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R ECAM Display Unit - AIR BLEED Page (Sheet 1/3)
Figure 012



7- PACK FLOW (G)

(A) WHEN $\Delta P \leq 0.50$ PSI

8- PACK VALVE

(G) : VALVE OPEN

(A) : VALVE CLOSED

9- WING ANTI-ICE (NOT DISPLAYED)

▷ ANTI ICE (G) (W) WHEN WING SUPPLY P/B SWITCH IS SELECTED ON

10- PRECOOLER INLET PRESSURE (G)

(A) WHEN $P \leq$ 8 PSI
$\geq$ 57 PSI
FLASHES AT 8 PSI WHEN ENG IS IN START MODE

11- PRECOOLER OUTLET TEMPERATURE (G)

(A) WHEN $t^{\circ} \geq 207^{\circ}$ C/ 255°C
$\geq 207^{\circ}$ C WITH WING ANTI-ICE OFF AND BOTH BLEED VALVES ON.
$\geq 255^{\circ}$ C WITH ONE BLEED VALVE OFF OR WING ANTI-ICE ON

12- BLEED VALVE

(G) : VALVE OPEN

(A) : VALVE CLOSED

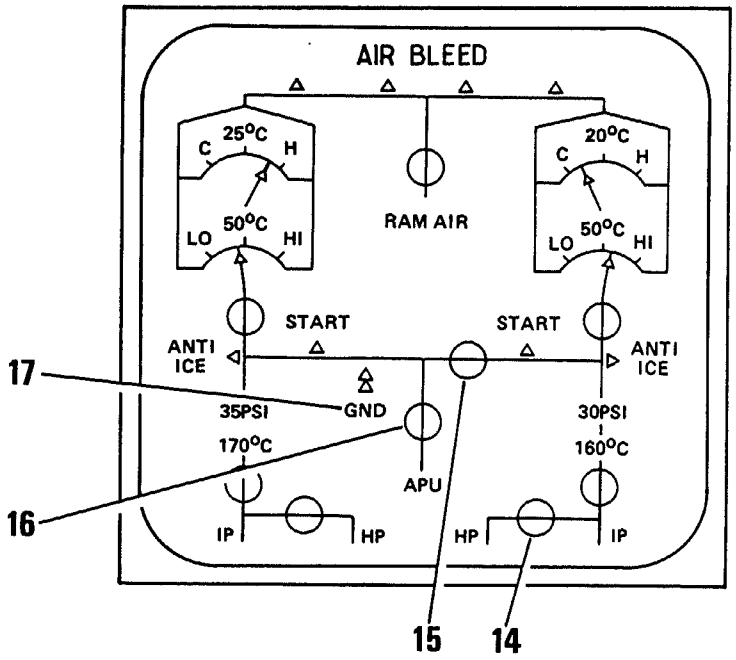
13- ENGINE START (NOT DISPLAYED)

START (W)

△ (G) WHEN ENG START SEL IS SELECTED START A, B OR CRANK.

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R ECAM Display Unit - AIR BLEED Page (Sheet 2/3)
Figure 012



14-HP VALVE

(G) : VALVE OPEN

(G) : VALVE CLOSED AUTOMATICALLY

HP VALVE P/B SWITCH IS SELECTED OFF

(A) : VALVE CLOSED
(A) : VALVE OPEN
} ACCORDING TO THE VALVE POSITION

15-X-FEED VALVE

(G) : VALVE OPEN

(G) : VALVE CLOSED

16-APU BLEED VALVE

(G) : VALVE OPEN

(G) : VALVE CLOSED

△ (W) : REPLACES VALVE INDICATION WHEN APU MASTER SW IS IN OFF POSITION

17-GROUND SUPPLY (NOT DISPLAYED IN FLIGHT)

GND (W) : (INDEPENDENT OF GROUND SUPPLY CONNECTION)

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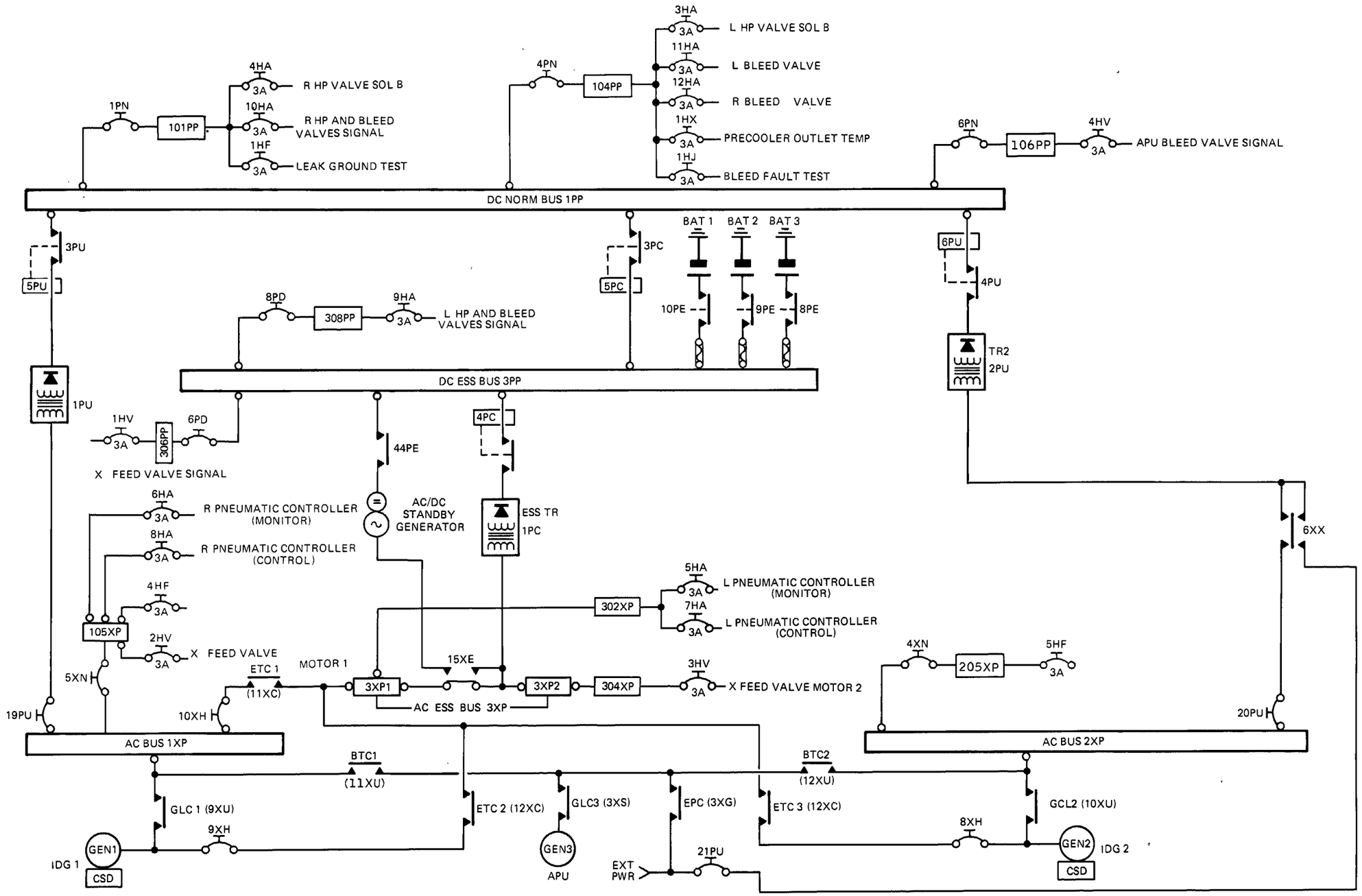
R ECAM Display Unit - AIR BLEED Page (Sheet 3/3)
Figure 012

POWER SUPPLY

BUSBARS AND CIRCUIT BREAKERS		VOLTAGE AND POWER SUPPLY	FUNCTIONS	ATA No.
101PP	4HA	28VDC-Norm	Power supply to right HP valve solenoid B.	36-11
	10HA	28VDC-Norm	Right HP valve and bleed valve indicating.	
104PP	3HA	28VDC-Norm	Power supply to left HP valve solenoid B	
	11HA	28VDC-Norm	Power supply to left bleed valve solenoid	
	12HA	28VDC-Norm	Power supply to right bleed valve solenoid	
	1HJ	28VDC-Norm	Supply for BLEED FAULT test	
308PP	9HA	28VDC-Ess Smoke	Left HP valve and bleed valve indicating	
105XPC	6HA	115 V-400 Hz NORM	Power supply to right controller (monitoring function).	
	8HA	115 V-400 Hz NORM	Power supply to right controller (operation)	
302XPC	5HA	115 V-400 Hz Ess Smoke	Power supply to left controller (monitoring function).	
	7HA	115 V-400 Hz Ess Smoke	Power supply to left controller (operation)	
306PP	1HV	28VDC-Ess	Crossfeed valve indicating.	36-12
106PP	4HV	28VDC-Norm	APU bleed valve indicating.	
304XPB	3HV	115 V-400 Hz Ess	Power supply to crossfeed valve motor No.2 (manual).	
105XPC	2HV	115 V-400 Hz Norm	Power supply to crossfeed valve motor No.1 (automatic).	
104PP	1HX	28VDC-Norm	Temperature indicator at precooler outlet, left and right.	36-21
101PP	1HF	28VDC-Norm	Ground test of ambient overheats.	36-22
105XPA	4HF	115 V-400 Hz Norm	APU, right wing (W2B), left wing (W1B), and left pylon overheat detection loops card.	
205XPC	5HF	115 V-400 Hz Norm	Right wing (W2A), left wing (W1A), and right pylon overheat detection loops card.	

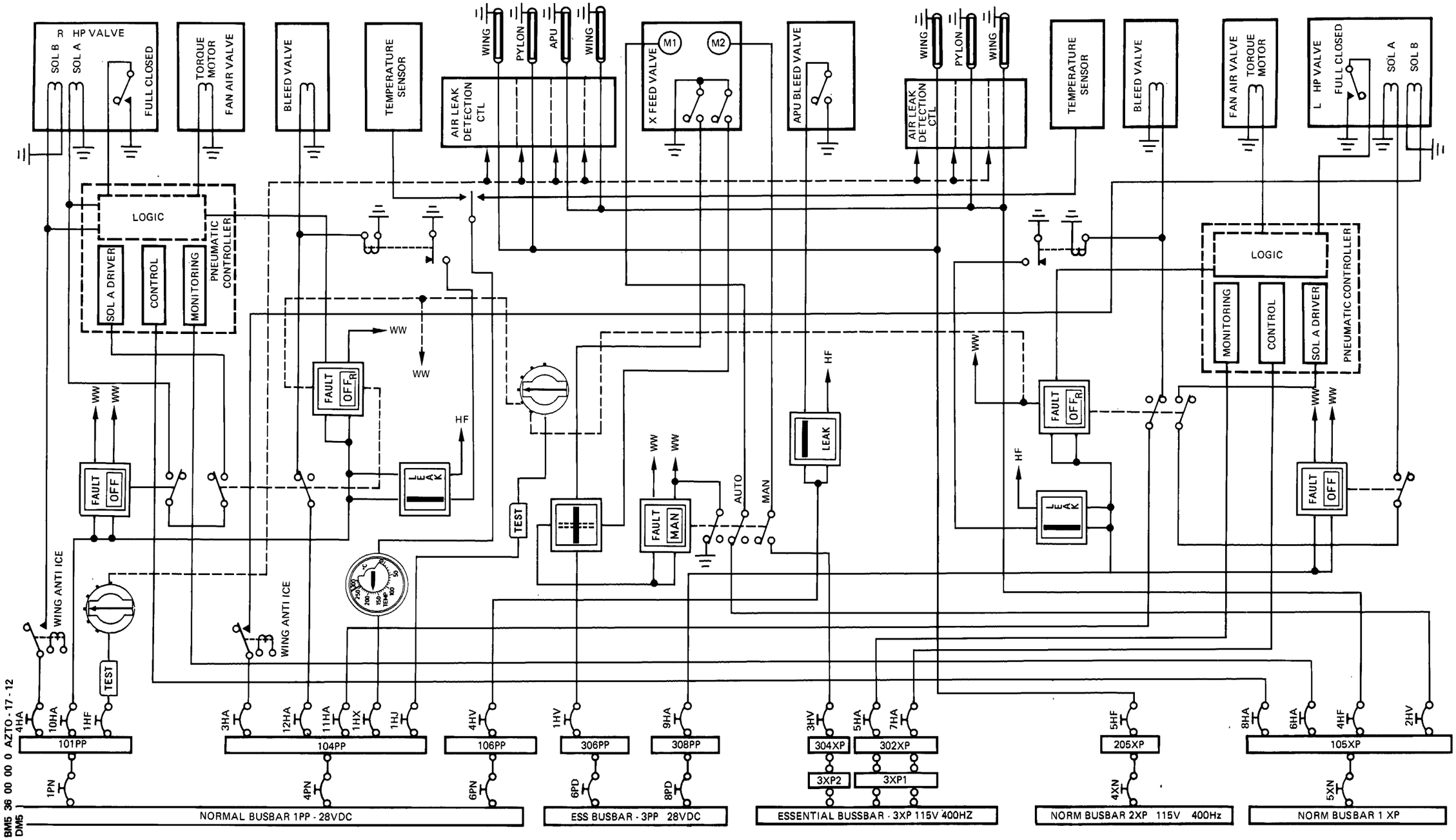
(Ref. Fig. 013)
(Ref. Fig. 014)

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DM5

Pneumatic System Power Supply
Figure 013



Pneumatic - General Schematic
Figure 014

1. General

The main pneumatic system includes the following sub-systems :

A. The temperature and pressure regulation system of air bled from the HP stages of the engine compressor, located in the nacelles and pylons.
The system associated with each engine consists mainly of :
. an HP valve
. a bleed valve which admits or cuts off engine bleed air supply and regulates and limits downstream pressure,
. an overpressure valve which protects the pneumatic system downstream in the event of failure of the bleed valve,
. an air to air heat exchanger precooler which regulates air temperature downstream of the system ; cooling is achieved by air bled from the engine fan through a fan air valve (temperature regulator valve) associated with the pneumatic system controller,
. several temperature sensors provided for regulation, overheat detection in ducts and temperature indications,
. a pneumatic system controller which receives information from the sensors, controls, monitors and regulates the system.
The controller includes a built-in test equipment (BITE) which serves for fault detection and isolation of the pneumatic system main components during ground maintenance. A ground in situ test enables to check pneumatic operation of the valves, using the test ports provided on the valves, and a test set ; this test is a complement to the BITE.

B. The APU bleed air supply and crossbleed (crossfeed) systems are mainly located in the mid and aft fuselage. The crossbleed system ensures crossfeed between the left and right bleed air systems.
The whole system consists mainly of :
- an APU bleed valve provided to bleed air from the APU compressor when the engine bleed air supply system is shut down or inoperative,
- a crossfeed valve provided for isolation and crossfeed of the right and left bleed air and distribution systems.

C. The ground compressed air supply system provided to supply the distribution systems from HP ground air supply units through ground connectors ; each of the ground connectors is equipped with a built-in nipple check valve and is located under the fuselage, in the right cooling air inlet.

D. The system ventilating the wing leading edge between the engine pylon and the fuselage with air tapped from a ram air inlet.

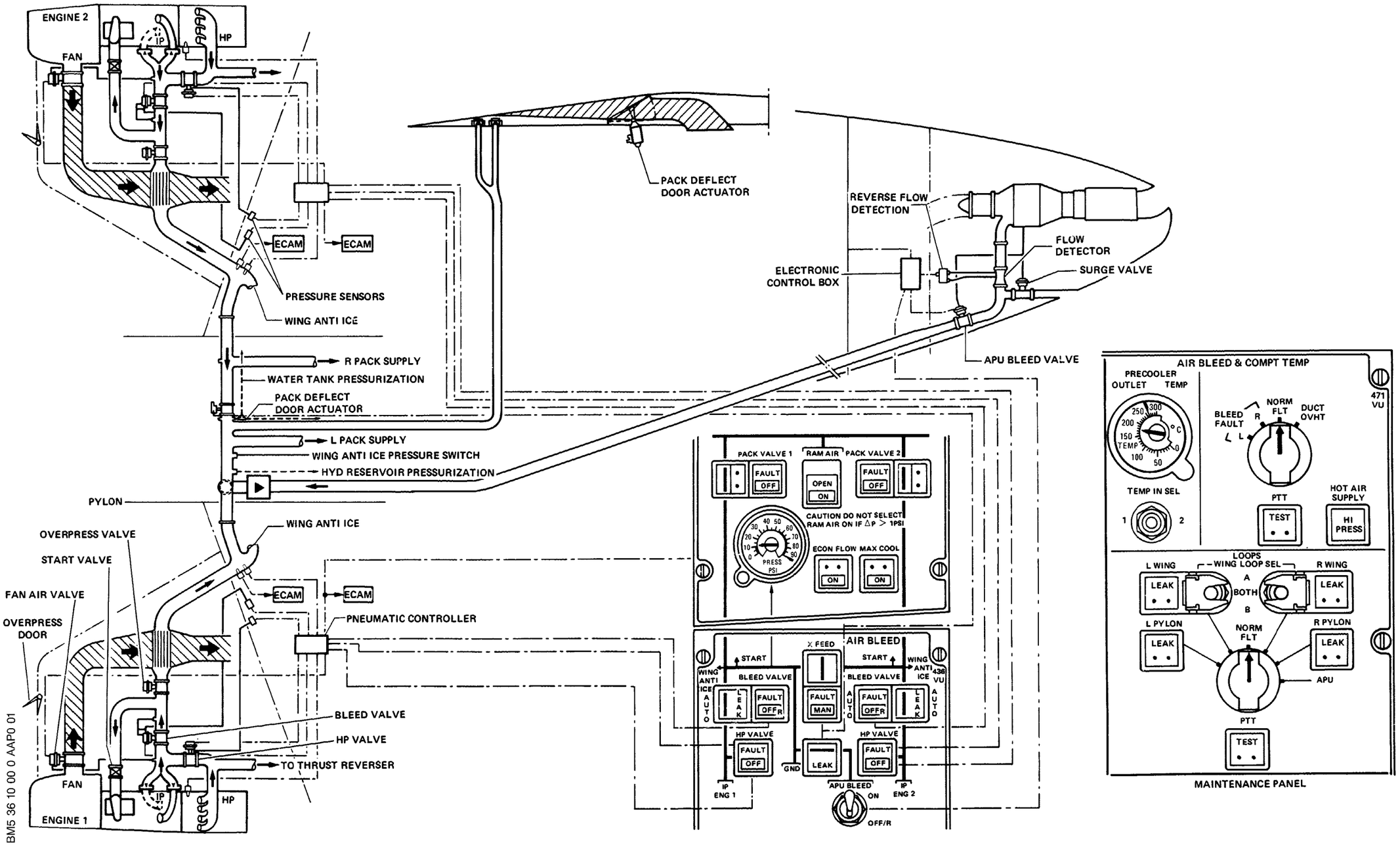
**ON A/C 101-200,

R (Ref. Fig. 001)

**ON A/C 001-100,

R (Ref. Fig. 002)

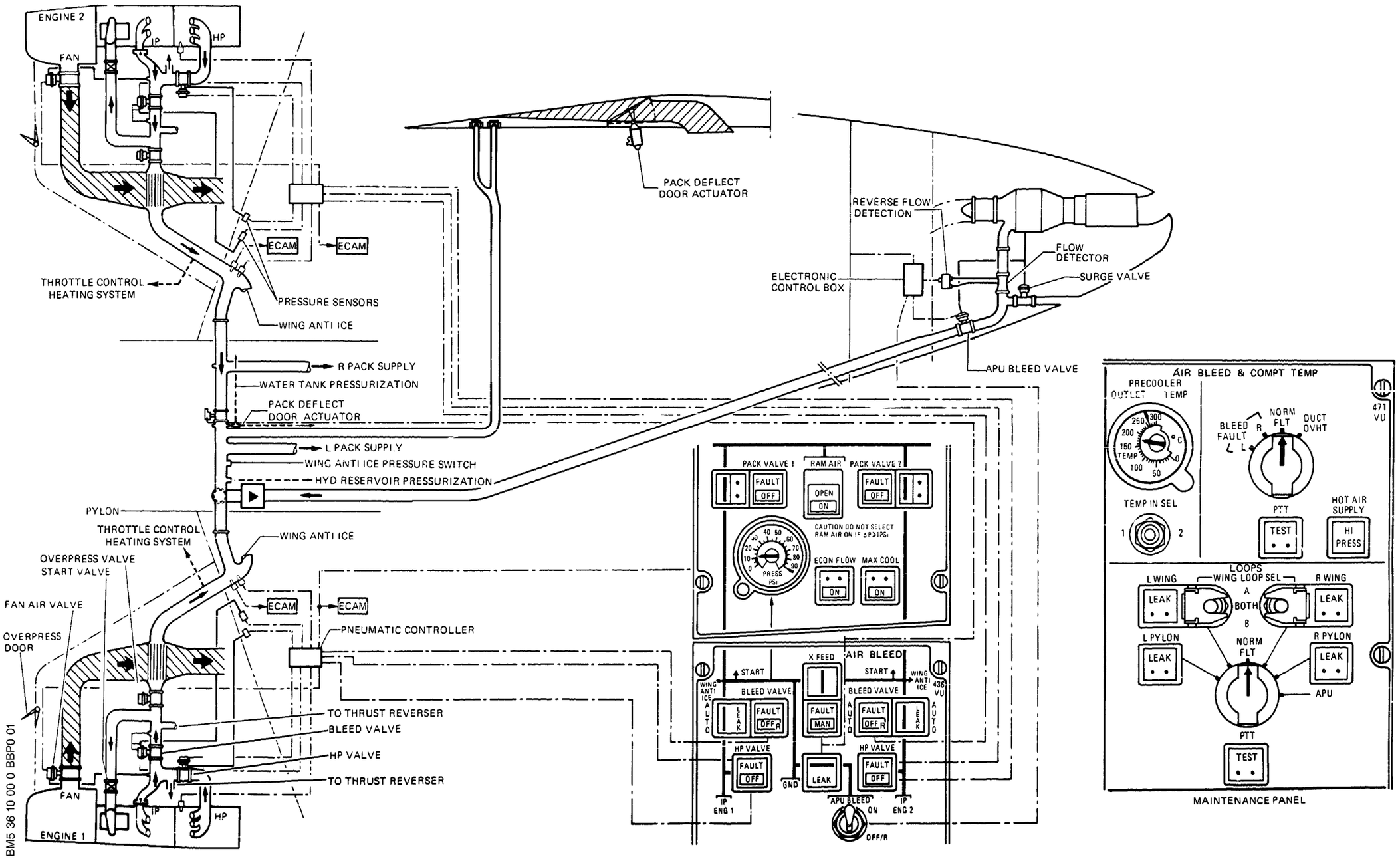
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BM5 36 10 00 0 AAP0 01

Air Bleed System Description - Schematic
Figure 001

R

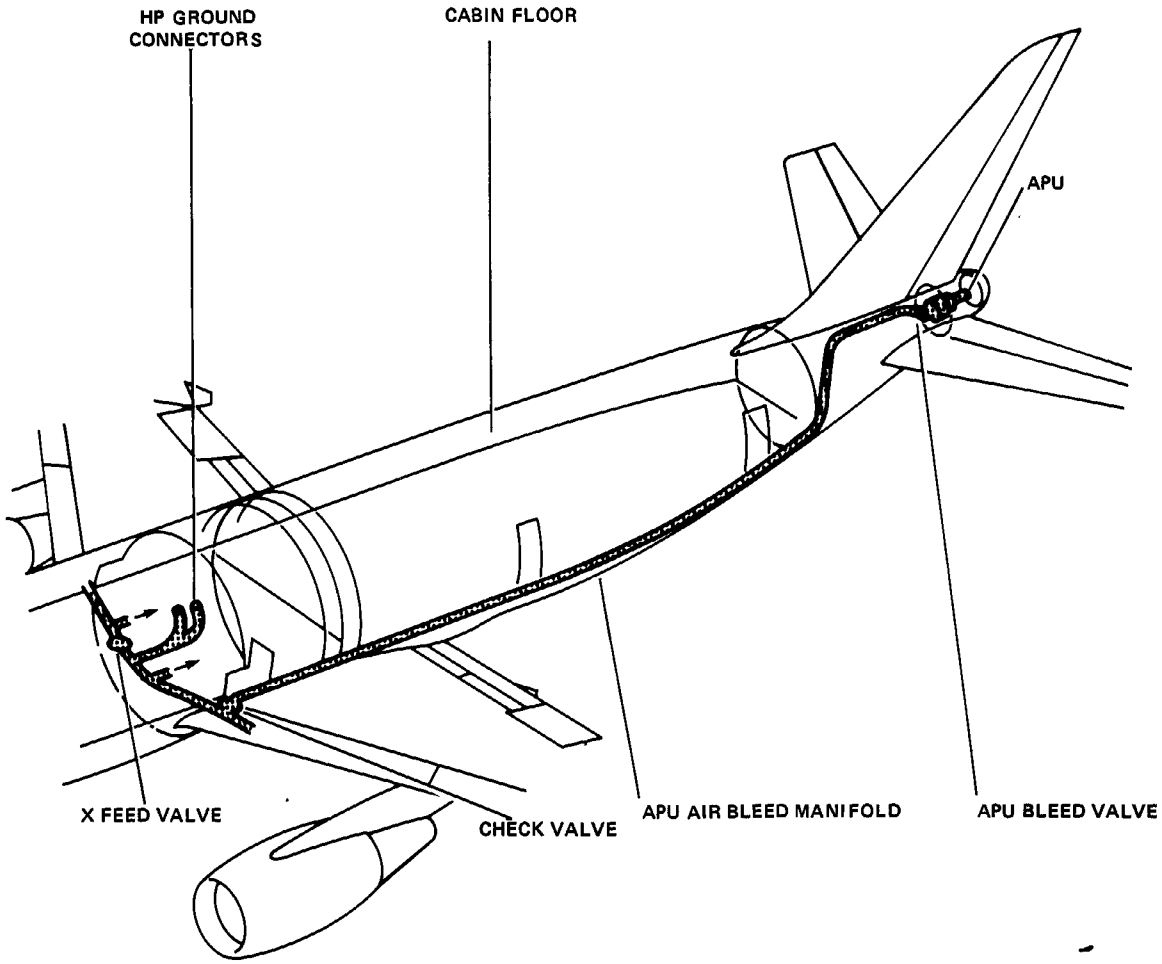


Air Bleed System Description - Schematic
Figure 002

R

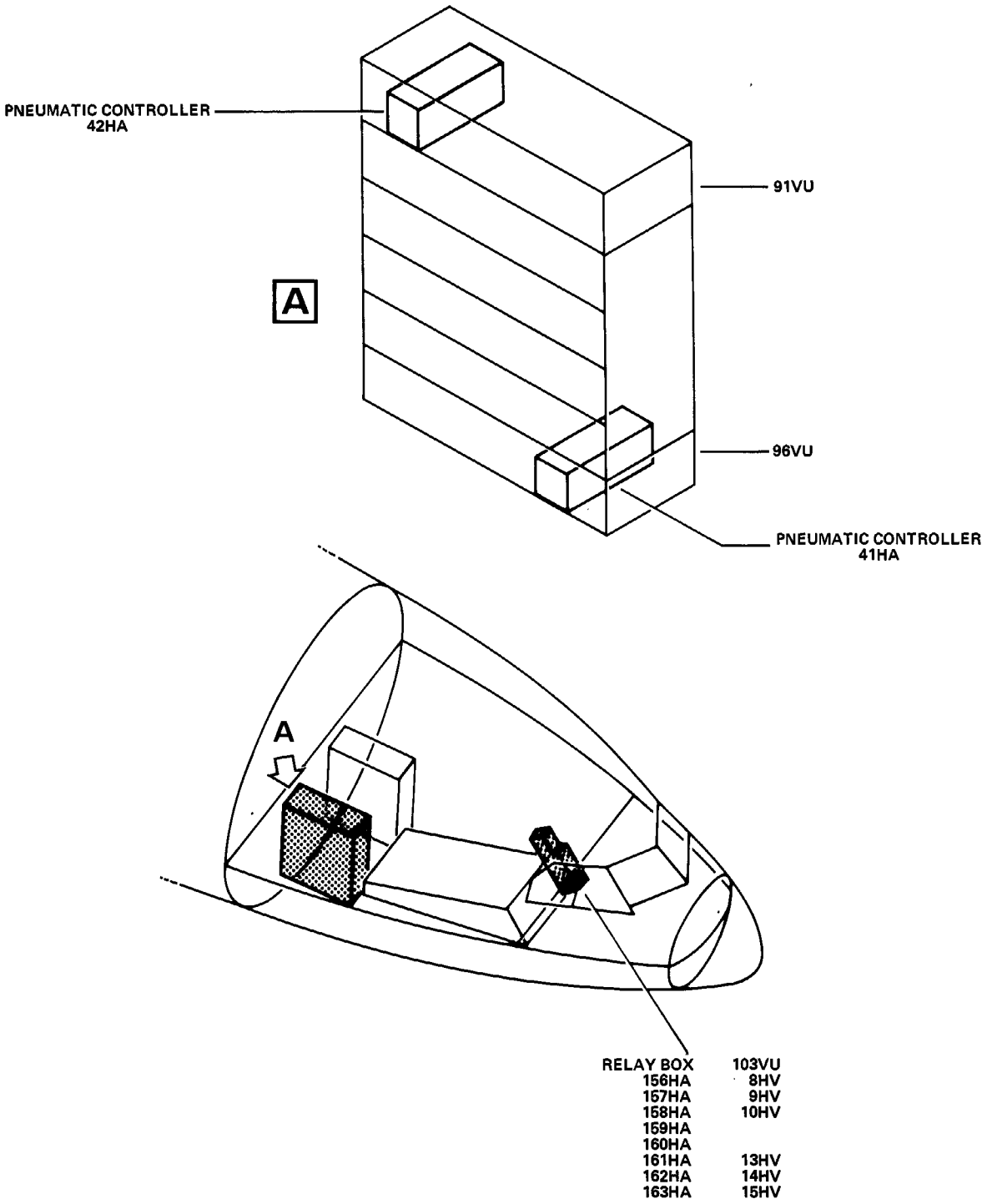
R **ON A/C ALL

(Ref. Fig. 003)
(Ref. Fig. 004)



BM5 36 10 00 0 AEMO DM5

Component Location in Fuselage
Figure 003



BM5 36 10 00 0 AGMO
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Pneumatic Controller and Relays - Location
Figure 004

ENGINE BLEED AIR SUPPLY SYSTEM - DESCRIPTION AND OPERATION

1. General

The system is designed to :

- select the compressor stage from which air is bled, depending on the pressure and/or temperature existing at the last stage of the engine HP compressor,
- regulate bleed air pressure in order to avoid excessive pressures,
- regulate bleed air temperature in order to avoid excessive temperatures.

(Ref. Fig. 001)

2. Component Location

(Ref. Fig. 002)

R

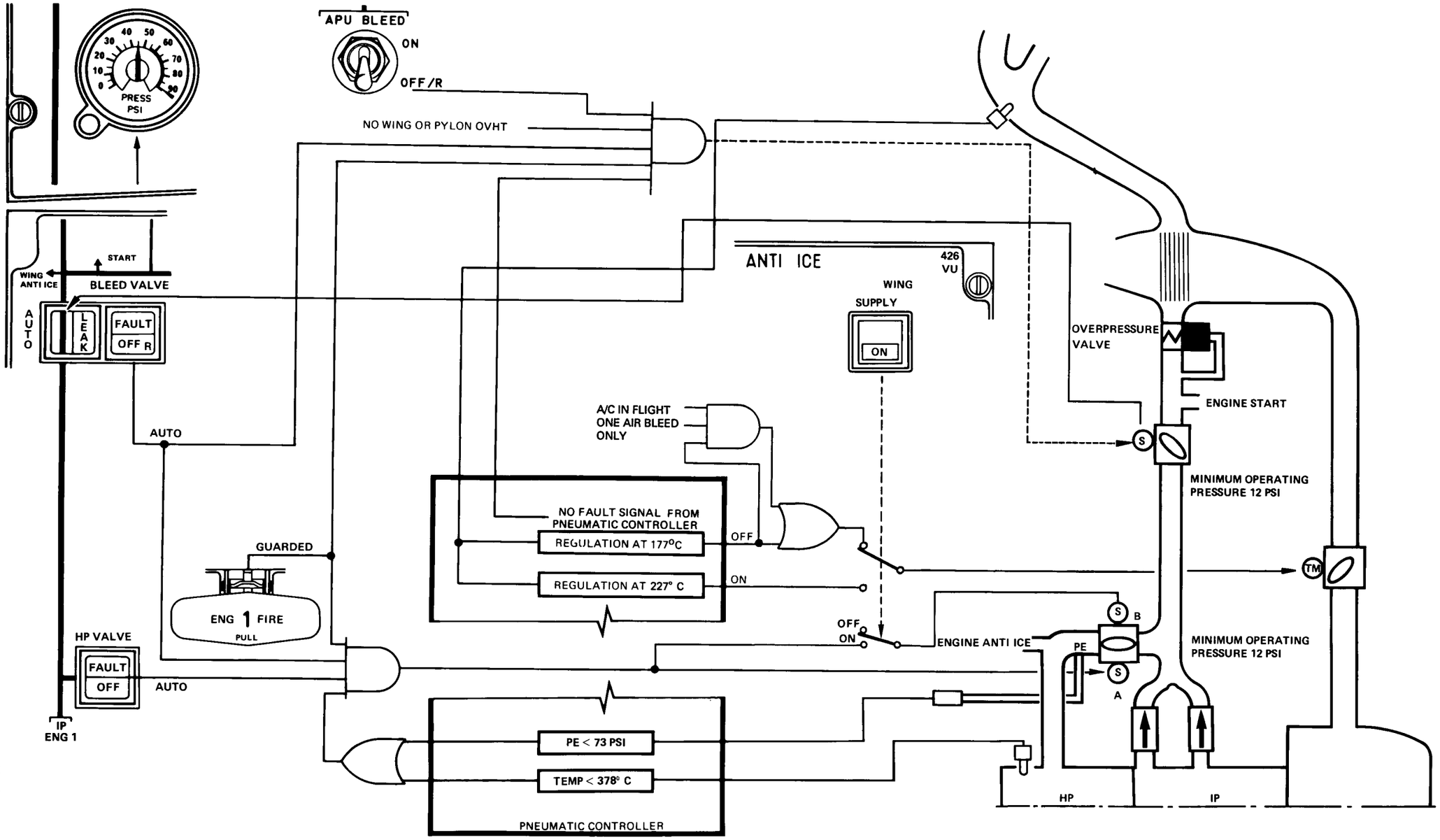
(Ref. Fig. 003)

R

(Ref. Fig. 004)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
41HA	CONTROLLER-PNEUMATIC, 1	96VU	122	121BL	36-11-19
42HA	CONTROLLER-PNEUMATIC, 2	91VU	122	121BL	36-11-19
47HA	SENSOR-HIGH STAGE PRESS, 1		415	415AL	36-11-23
48HA	SENSOR-HIGH STAGE PRESS, 2		425	425AL	36-11-23
49HA	SENSOR-REGULATOR PRESS, 1		415	415AL	36-11-22
50HA	SENSOR-REGULATOR PRESS, 2		425	425AL	36-11-22
51HA	VALVE-FAN AIR, 1		451	451AL	36-11-16
52HA	VALVE-FAN AIR, 2		461	461AL	36-11-16
53HA	SENSOR-TEMP CONTROL, 1		471	471AL	36-11-21
54HA	SENSOR-TEMP CONTROL, 2		481	482AR	36-11-21
149HA	P/BSW-AIR BLEED/ ENG1/HP VALVE	436VU	211		36-11-00
150HA	P/BSW-AIR BLEED/ENG2/BLEED VALVE	436VU	211		36-11-00
151HA	P/BSW-AIR BLEED/ENG1/BLEED VALVE	436VU	211		36-11-00
152HA	P/BSW-AIR BLEED/ENG2/HP VALVE	436VU	211		36-11-00
153HA	ANNUNCIATOR-AIR BLEED/ENG1/BLEED VALVE	436VU	211		36-11-00
154HA	ANNUNCIATOR-AIR BLEED/ENG2/BLEED VALVE	436VU	211		36-11-00
DV224	VALVE-BLEED, ENG1		451	451AL	36-11-14
DV225	VALVE-HP, ENG1		451	451AL	36-11-12
A007	PRECOOLER-BLEED AIR, 1		413	413BL	36-11-15
A009	VALVE-OVERPRESSURE, ENG1		413	413AL 414AR	36-11-17
A004	CHECK VALVE-IP, ENG1		451	451AL 435AL	36-11-13
C004	CHECK VALVE-IP, ENG1		451	451AL 435AL	36-11-13
H29	SENSOR-HIGH STAGE TEMP, ENG1		453	451AL	36-11-18
DV224	VALVE-BLEED, ENG2		461	461AL	36-11-14

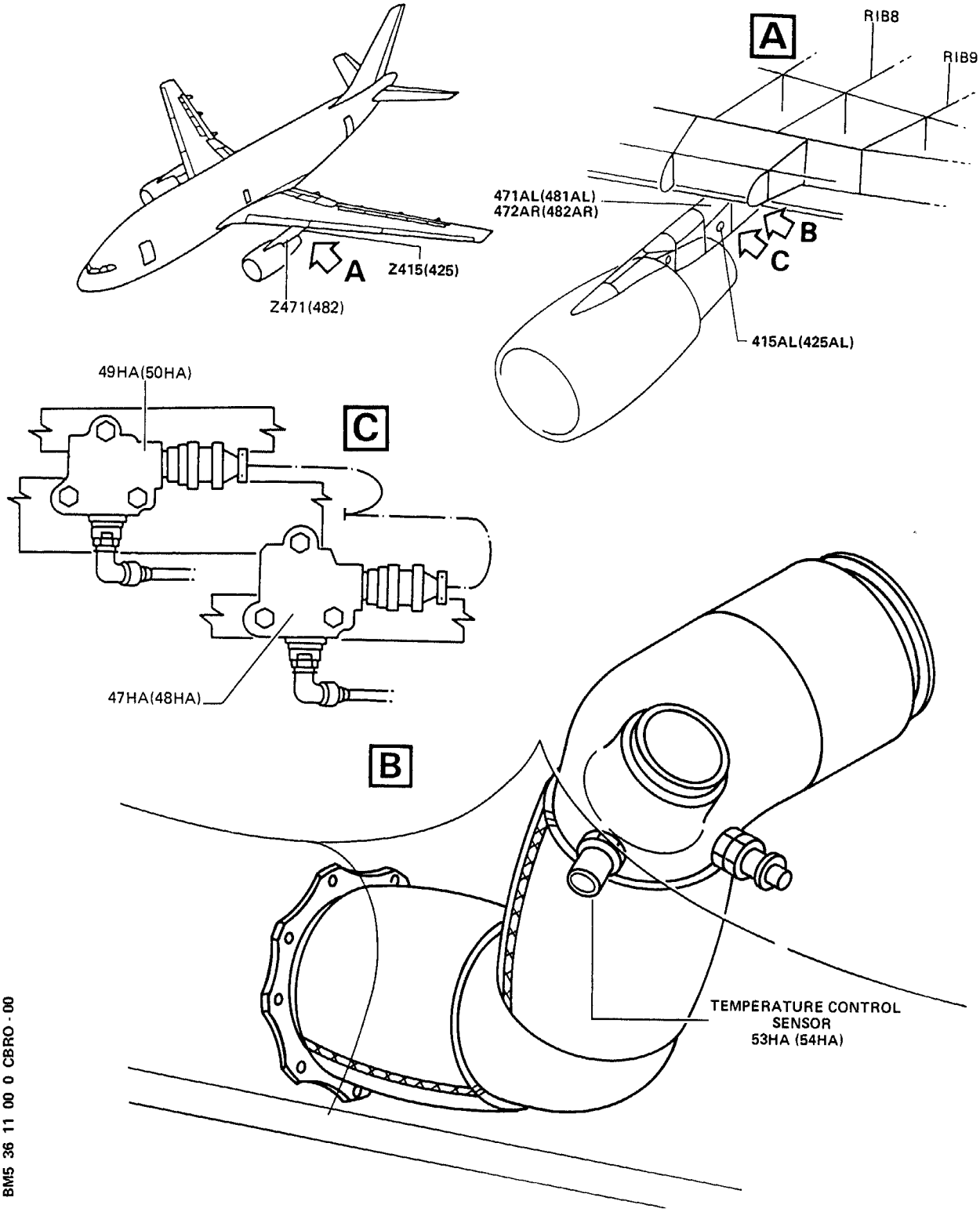
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
DV225	VALVE-HP, ENG2		461	461AL	36-11-12
B007	PRECOOLER-BLEED AIR, 2		423	423BL	36-11-15
B009	VALVE-OVERPRESSURE, ENG2		423	423AL 424AR	36-11-17
B004	CHECK VALVE-IP, ENG2		461	461AL 445AL	36-11-13
D004	CHECK VALVE-IP, ENG2		461	461AL 445AL	36-11-13
H29	SENSOR-HIGH STAGE TEMP, ENG2		463	461AL	36-11-18



BM5 36 11 00 0 ABRO - 00

Engine Air Bleed - Schematic
Figure 001

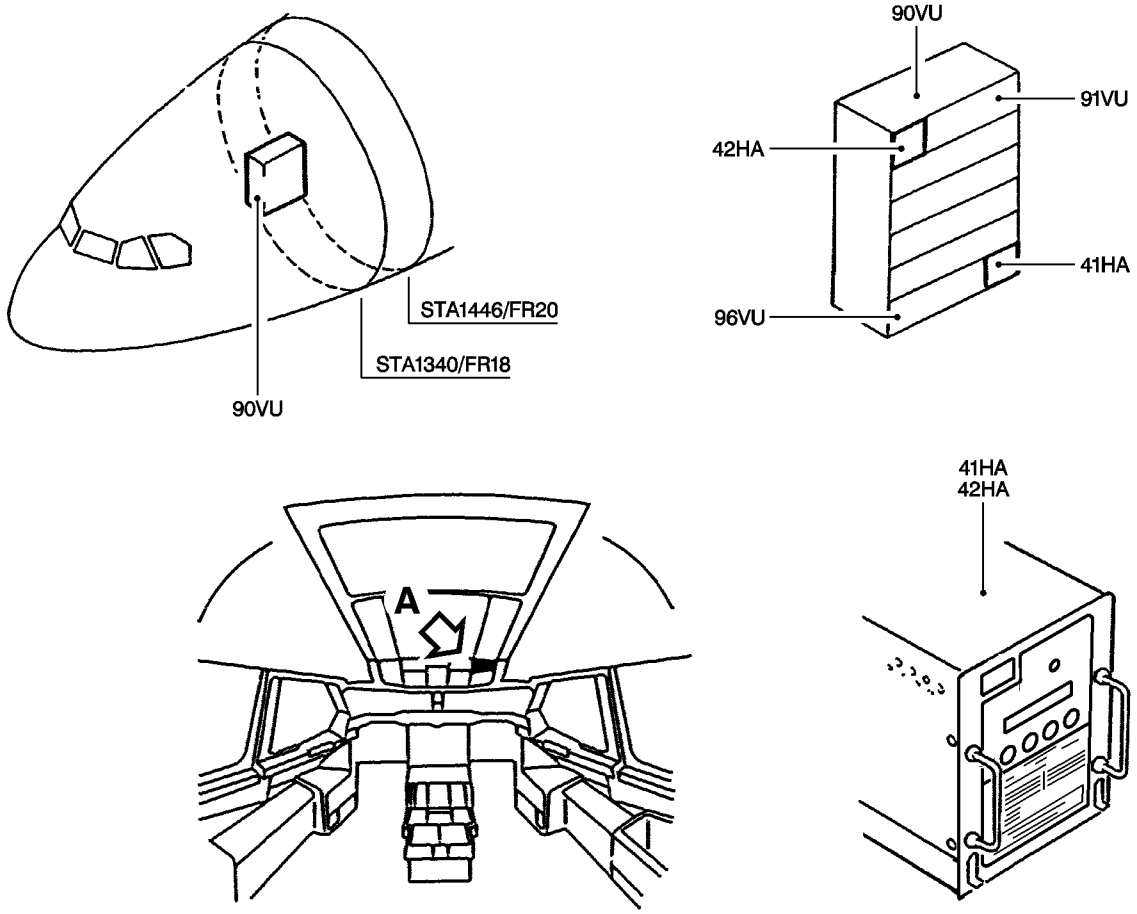
R



BM5 36 11 00 0 CBRO-00

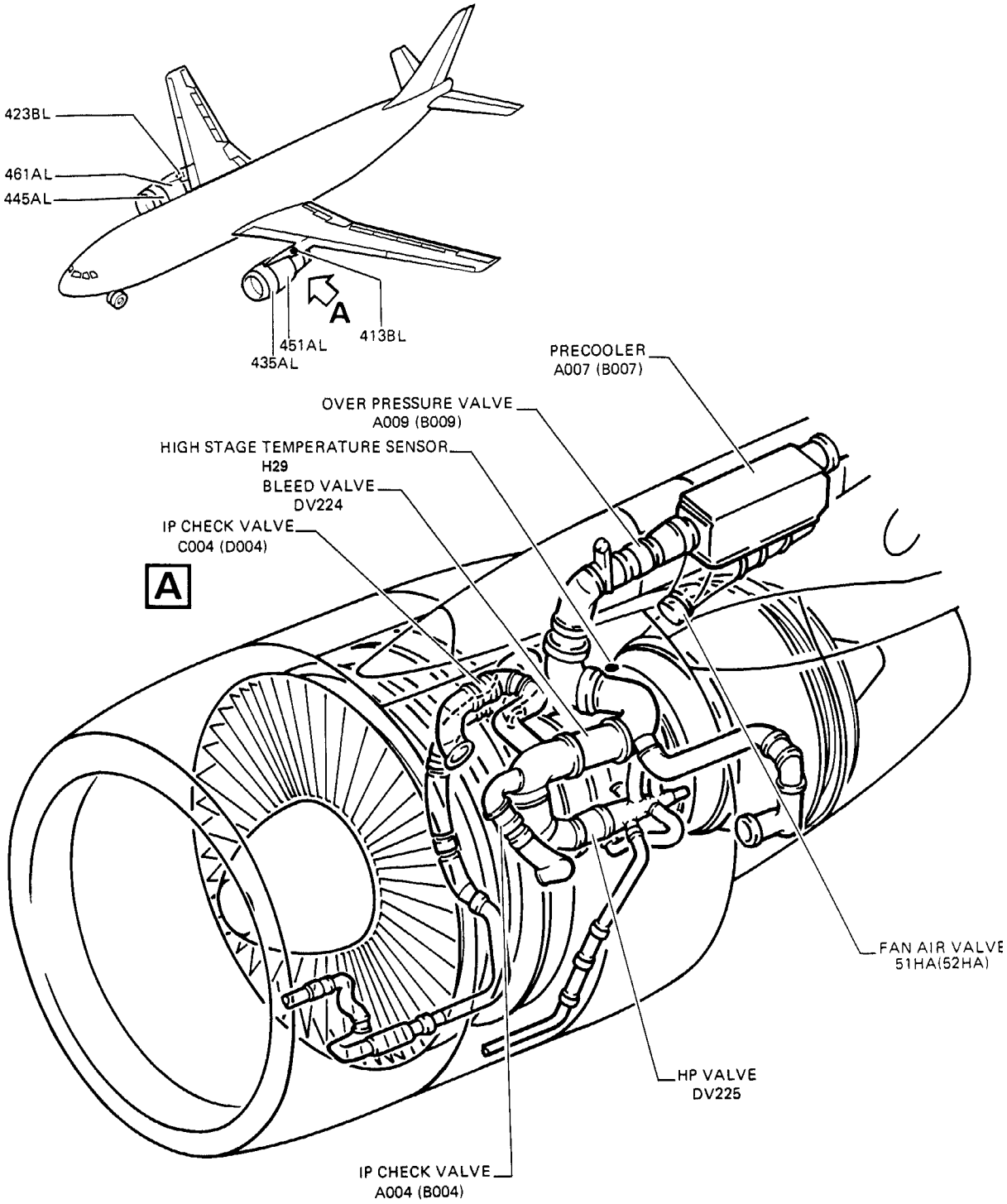
Sensors - Location
Figure 002

R



BM5 36 11 00 0 CAQ0 00

Control and Indicating - Location
Figure 003



BM5 36 11 00 0 CCPO - 00

Component Location in Nacelle and Pylon
Figure 004

3. Air Bleed Selection

A. Description and Operation

Air is generally bled from an intermediate stage of the engine HP compressor (IP stage) to minimize engine pressure losses : this is the normal engine air bleed configuration.

. The IP stage is the 8th HP compressor stage. During low engine speeds, when the temperatures and pressures from the IP stage are insufficient, air is automatically bled from the last compressor stage (HP stage), particularly for certain holding points and during descent, with engines at idle.

. The HP stage is the 15th HP compressor stage.

Transfer of air bleed is achieved by means of a pneumatically operated, electrically controlled butterfly valve, designated HP valve.

When the HP valve is closed, air is directly bled from the IP stage through two IP check valves fitted with two flappers.

When the HP valve is open, the HP stage pressure is admitted into the pneumatic ducting and closes the check valves ; air is therefore bled from the HP stage only. The HP-IP transfer is selected to meet the conditions upstream of the valve (pressures and temperatures at the HP compressor stage).

The valve includes two solenoids (A and B) which control valve opening or closing for two different pressure values, depending on whether the wing ice protection system is operational or not.

In normal automatic operation, the valve is :

(1)Pneumatically operated :

. closed if upstream pressure is greater than transfer pressure (PT) ;

. open if upstream pressure is lower than transfer pressure.

With wing ice protection system off :

solenoid A only is energized, transfer pressure is 86 ±4 psig.

With wing ice protection system on :

solenoids A and B are energized, transfer pressure is 141 ±4.5 psig.

(2)Electrically controlled closed by de-energization of solenoid A, as soon as upstream temperature exceeds transfer temperature (TT). The electrical signal generated by a sensor located on the engine is transmitted by the controller. Transfer temperature (TT) = 378°C ±3°C if HP stage air pressure (PE) is higher than 73 psig.

B. HP Valve Description

(Ref. Fig. 005)

(Ref. Fig. 006)

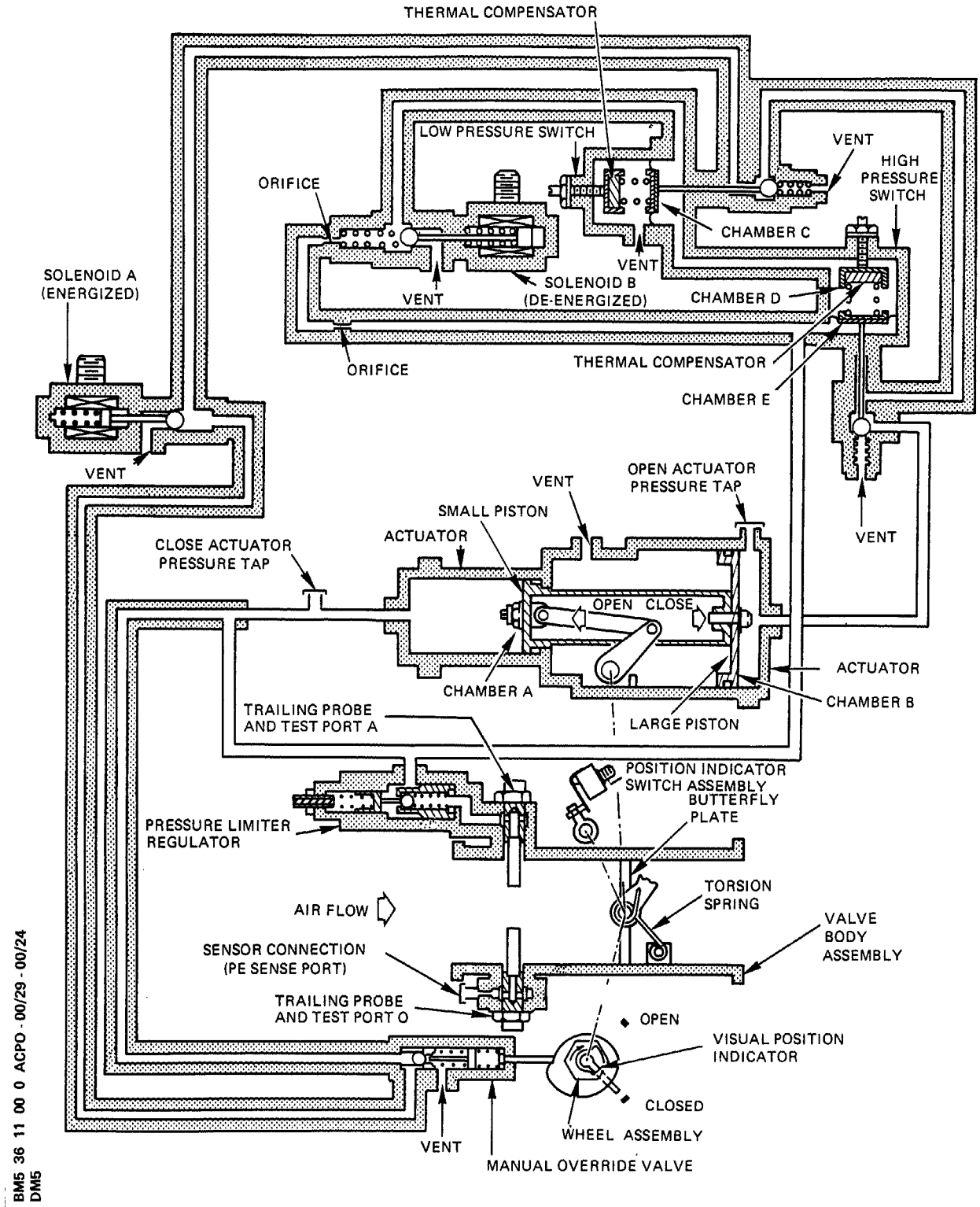
As most of the electro-pneumatically operated valves, the HP valve is spring-loaded closed in the absence of pressure ; it opens at a minimum upstream pressure (12.5 psig). The valve can be manually locked in closed position (ground check) and is provided with an in situ test port.

The shutoff valve is of the butterfly-type, 5 in.dia., pneumatically operated and controlled by two solenoids (A and B).

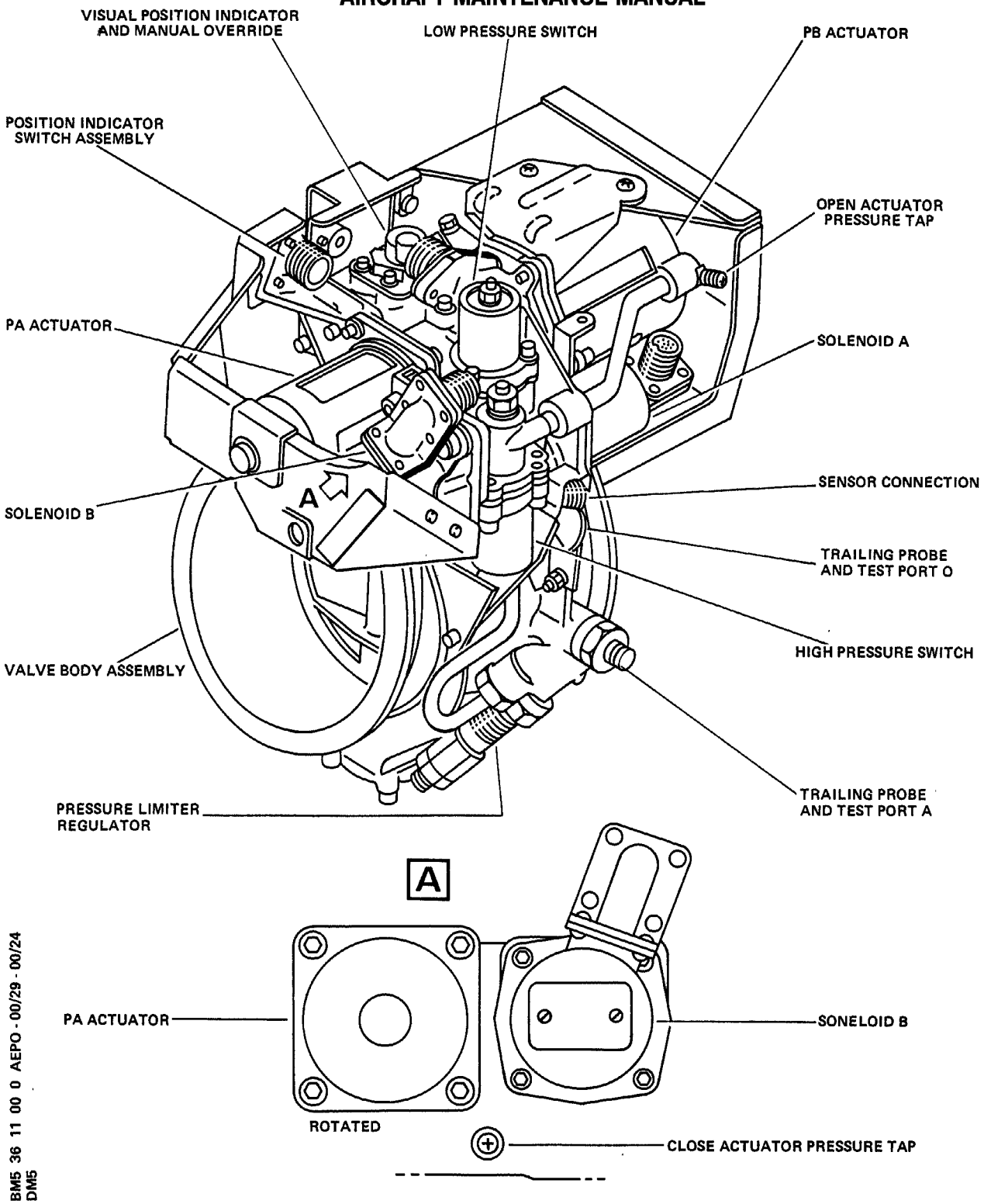
The valve is normally spring-loaded closed in the absence of power supply or upstream pressure.

. Opening of the valve

When solenoid A is energized, upstream air is admitted into chamber A



HP Valve - Schematic
Figure 005



HP Valve - Perspective View
Figure 006

via a pressure limiter then into chamber B via the low and high pressure switches. Since chamber B piston is larger than chamber A piston, the resulting force exerted from B to A overcomes the force of the torsion spring at a preset pressure value, thus causing the valve to open and maintaining it open.
This preset value corresponds to an upstream pressure of 10 psig.

. Closing of the valve :
When solenoid A is de-energized, chamber B is vented to ambient while upstream air is still admitted directly into chamber A. The pressure in chamber B associated with the load exerted by the butterfly spring closes the valve.

. Low lever transfer :
When solenoid B is not energized, pressure in chamber D is identical to that of chamber E, and the high pressure switch remains closed under the load exerted by chamber D spring.
When pressure in chamber C reaches the preset value, the low pressure switch vents chamber B to ambient ; therefore, the valve closes under the load exerted by the spring and the pressure in chamber A.
When pressure decreases upstream of the valve, the load exerted by the low level switch spring predominates ; therefore chamber B is no longer vented but pressurized again and the valve opens.

. High level transfer :
When solenoid B is energized, chambers C and D are vented to ambient.
When pressure in chamber E reaches the preset value, the high level switch opens, thus venting chamber B to ambient and causing the valve to close.
When pressure decreases upstream of the valve and below the preset value, the load exerted by the high level switch spring predominates ; thus chamber B is no longer vented and the valve opens again.
Thermal compensators installed in the low and high level switches are provided to avoid changes in preset values due to temperature variations.

. Emergency control, safety devices and indicating :
A manual override provided with a hex cam lifts the ball from its seat by means of a rod, thus venting to ambient the whole control system and resulting in complete closure of the valve. In addition, a wheel assembly directly connected to the valve butterfly shaft enables mechanical opening or closing of the valve on the ground.
A pressure limiter closes the control system when upstream pressures are excessive, to avoid damage to the pneumatic actuator.
The valve is fitted with a limit microswitch which cuts off the indicating circuit, 7° from fully closed position. A butterfly visual position indicator is incorporated in the manual override.
The HP valve is fitted with two test ports provided to perform the in situ test, and with one test port provided for the high stage pressure sensor.

C. HP Valve - Controls and Indicating

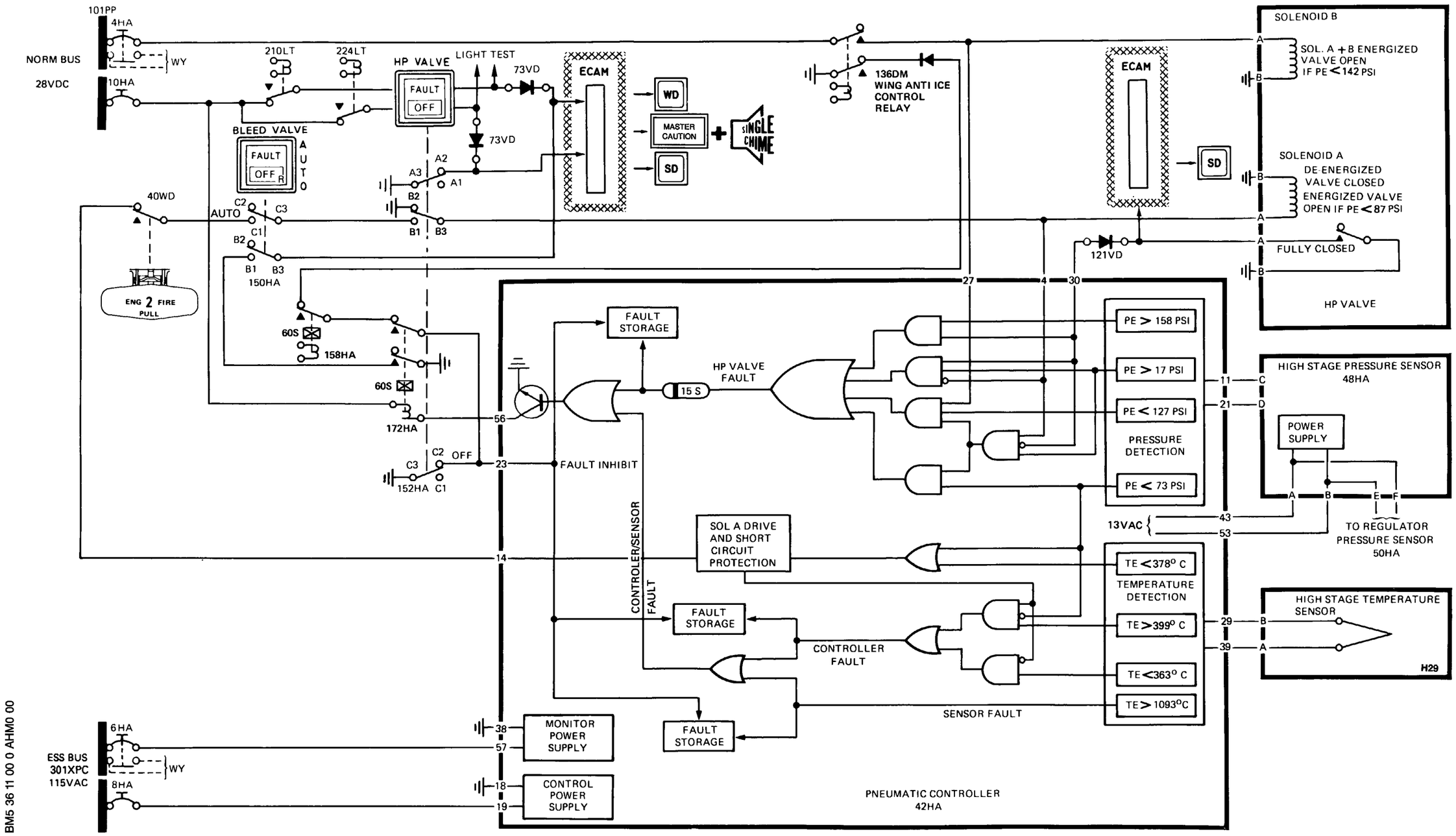
(1)HP VALVE pushbutton switch pressed (in)

. Indicating : OFF and FAULT legends off.
This configuration corresponds to valve normal automatic operation controlled by the pneumatic controller.

R (2)Illumination warning light :
R FAULT amber warning legend on with ECAM system activated after a
R 60 second time delay.
. MASTER CAUTION lights comes on on CAPT and F/O main instrument panels 3VU and 5VU.
. Single chime.
. On the left ECAM display unit : display of the warning and its associated actions.
. On the right ECAM display unit : display of the AIR BLEED page.
The warning signal is generated by the pneumatic controller in all cases and indicates failure of the HP valve or its automatic control :
- failure of the sensor measuring HP air temperature
- failures of temperature regulation of HP bleed air (TE) :
. TE > HP maximum temperature (399°C), valve opening command (solenoid A energized) and PE > 73 psig
. TE < HP minimum temperature and valve closing command (solenoid A non-energized) (minimum HP temperature = 363°C)

(Ref. Fig. 007)

- failure of valve
. valve closing command (solenoid A non-energized), valve not closed and PE > 17 psig
. HP stage pressure (PE) > 158 psig and valve not closed ;
. 17 psig < PE < 73 psig and valve closed (solenoid A only energized : ice protection system off) ;
. 17 psig < PE < 127 psig and valve closed (solenoids A and B energized : ice protection system on).
Action : Close the HP valve by pressing the HP VALVE pushbutton switch (OFF).
R NOTE : - De-energization of solenoid A automatically controls valve
R closing when :
R . The associated BLEED VALVE pushbutton switch is released
R (out) (OFF/R)
R . The associated ENG FIRE handle is actuated.
R - HP valve opening is made possible only if the associated BLEED
R VALVE pushbutton switch is pressed (in) (AUTO).
(3)HP VALVE pushbutton switch released (out)
. Indicating : OFF legend on (white), FAULT legend off.
This configuration corresponds to valve closing controlled by de-energization of solenoid A.
R (4)Illumination warning light :
R FAULT legend on (amber) with ECAM system activated : MASTER CAUTION
R lights comes on on CAPT and F/O main instrument panels 3VU and 5VU with
R single chime.
This indicates that the HP valve has remained open and therefore the associated bleed valve should be closed by releasing the BLEED VALVE



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HP Valve - Electrical Schematic
Figure 007

pushbutton switch (OFF/R) : AIR warning light is inhibited and FAULT legend goes off.

NOTE : After engine shut down it is possible that ECAM (AIR BLEED page display) indicates one or both HP valve (s) OPEN, although they are springloaded closed. This complaint can be caused by internal friction in the HP valve (s) that can result in not actuating the close limit switch. This is not an abnormal situation.
When there are no complaints during normal operation it is not necessary to replace the HP valve (s).

4. Pressure Regulation and Limitation

A. Description and Operation

Downstream of the junction of the IP and HP ducting, air is admitted into the duct by a pneumatically operated, electrically controlled butterfly valve which acts as a shutoff and pressure regulator valve. This valve is designated bleed valve.

It includes a single solenoid which closes the valve when energized and enables pressure regulation when de-energized.

When upstream pressure is sufficient, downstream pressure is regulated at 46 ±2 psig and the pneumatic time-delay prevents abrupt closing of valve and resulting overpressure.

The bleed valve automatically closes in the following cases :

. overheat at the precooler outlet,
. ambient overheat in pylon/fuselage/wing ducts surrounding area,
. failure of pressure regulation,
. failure of temperature regulation at the precooler outlet,
. actuation of ENG FIRE handle,
. APU bleed valve open.

In the absence of air pressure, the valve is spring-loaded closed independently from electrical power supply ; the valve starts to open for a minimum upstream pressure (12 psig) ; it incorporates a reverse flow check mechanism and can be manually locked closed. The valve is provided with an in situ test port.

- An overpressure valve installed at the pylon duct inlet protects the system against overpressure.

B. Bleed Valve Description

- Function

The valve admits or cuts off engine bleed air supply and regulates maximum pressure downstream at a differential preset value, greater than that of ambient pressure. In addition, the valve incorporates a reverse flow check mechanism.

- Operation

The valve is of the butterfly type, 6 in. dia. Opening of valve and regulation of downstream pressure are achieved pneumatically ; closing of valve is controlled by a solenoid.

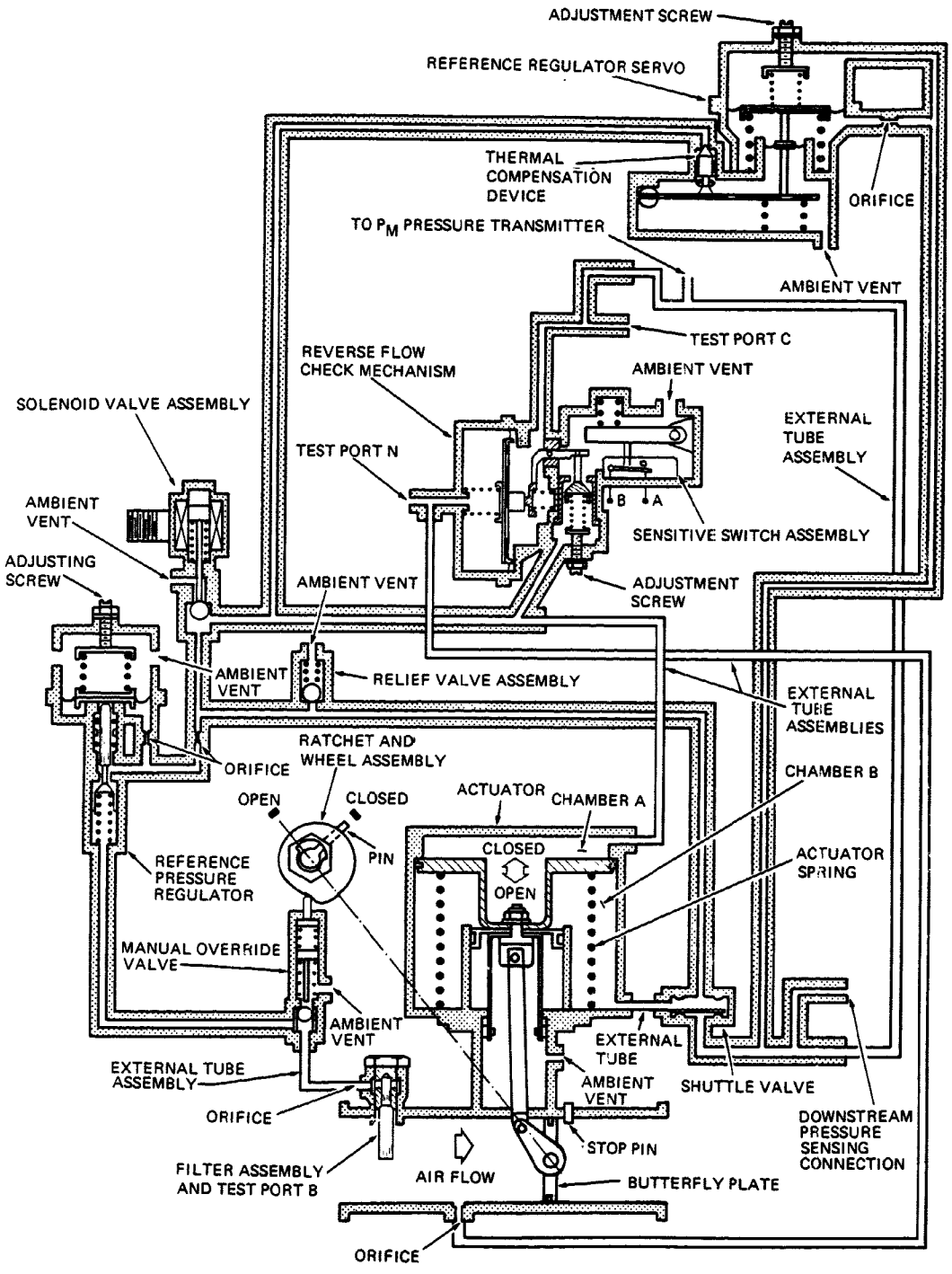
(Ref. Fig. 008)

- Opening and regulation

When the solenoid is not energized, the ball valve blanks off the vent orifice, upstream air is thus ported through a filter into a reference pressure regulator which provides a constant reference pressure : pressure simultaneously enters chamber A and B through a shuttle valve.

When upstream pressure reaches the value determined by the load of the spring and the difference in areas to which pressure is applied in chambers A and B, the butterfly fully opens.

Downstream pressure is then admitted into the regulator servo and the shuttle valve ; when upstream pressure reaches then exceeds the regulated downstream pressure required, the regulator servo when venting chamber A by means of a thermal compensator device, provides the reference pressure required to balance the force exerted in chamber B by downstream pressure.



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Bleed Valve - Schematic
Figure 008

R EFFECTIVITY: 101-200,

PIA

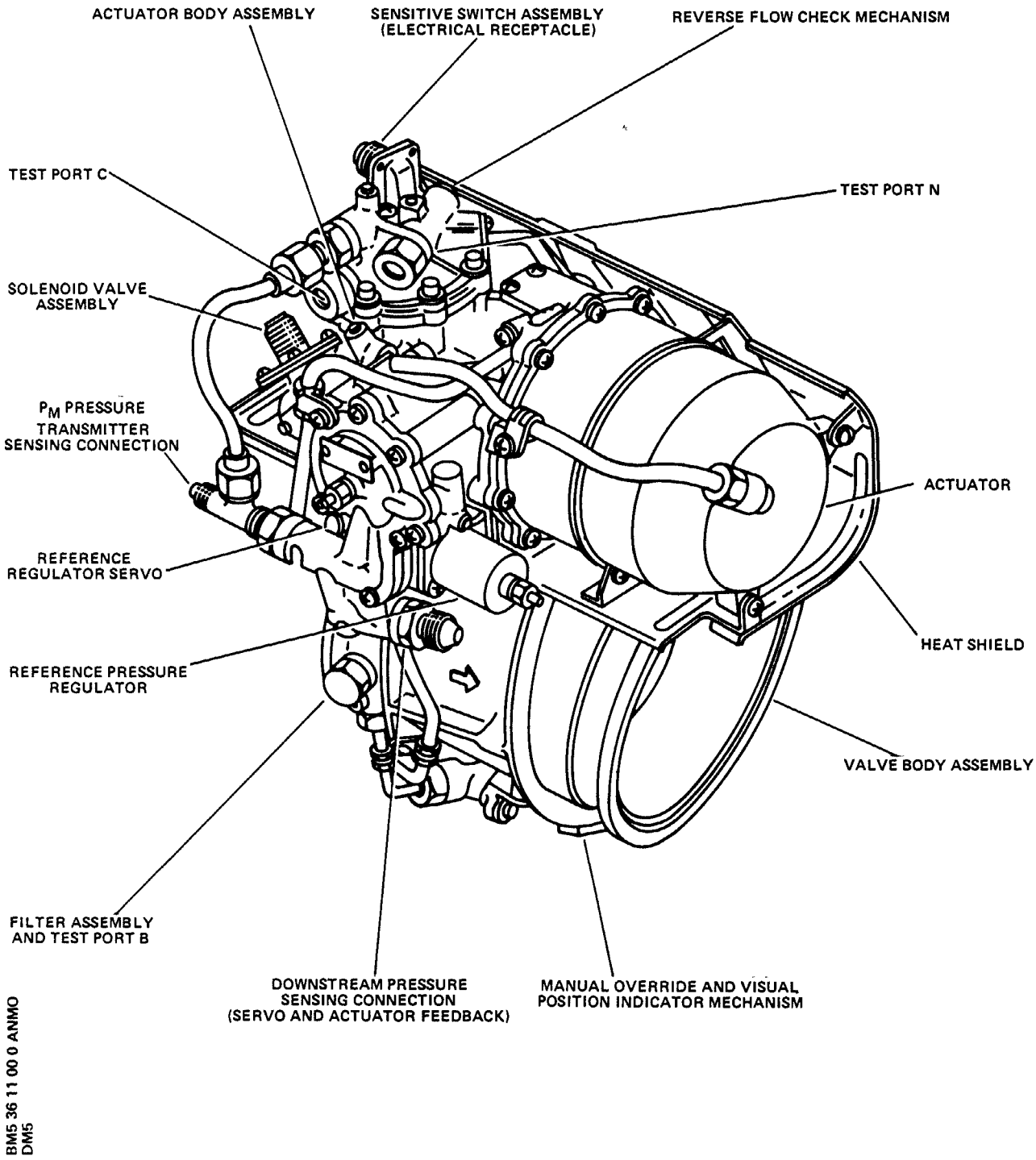
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The regulator servo is sensitive to small variations in downstream pressure and regulates pressure in chamber A according to upstream pressure variations and flow requirements.
The regulator servo incorporates a diaphragm assembly providing rapid response of the valve to upstream pressure transients.
- Closing
When the solenoid is energized, the ball of the solenoid displaces and closes off reference pressure supply to chamber A which is immediately vented to ambient.
The load exerted simultaneously by the spring and the pressure in chamber B closes the valve ; the valve is held closed as long as the solenoid is energized.
- Reverse flow check function
The reverse flow check mechanism compares upstream pressure to downstream pressure. When the difference between these pressures reaches a preset value, the reverse flow check mechanism poppet valve is activated to bleed off chamber A pressure to ambient, allowing the actuator spring and pressure supply through the shuttle valve to position and maintain the butterfly closed.
Closing of the valve is achieved when the difference between downstream pressure and upstream pressure is greater than a value ranging between 0.01 and 0.5 psid (0.7/35 mb).
- Emergency control, safety devices and indicating
The valve includes a manual override provided with a hex cam which lifts a ball from its seat by means of a rod ; this causes venting of upstream pressure and consequently, full closing of the valve.
A wheel assembly directly connected to the valve butterfly shaft enables mechanical opening or closing of the valve on the ground.
A pressure relief valve protects the pneumatic actuator in the event of failure of the reference pressure regulator.
A pressure switch opens the valve indicating circuit as soon as upstream pressure exceeds downstream pressure by a preset value.
(Ref. Fig. 009)

C. Bleed Valve - Controls and Indicating
(Ref. Fig. 010)
(1)**BLEED VALVE** pushbutton switch pressed (in)
Indicating : **OFF/R** legend off, **FAULT** legend off and **LEAK** legend of **BLEED VALVE** annunciator off.
This configuration corresponds to valve normal automatic operation which depends on the bleed air supply source :

From Engines	From APU
APU BLEED switch in **OFF/R** position.	**APU BLEED** switch in **ON** position.
The flowbar of **APU BLEED** annunciator is **OFF**.	The flowbar of **APU BLEED** annunciator is **ON**.
The engine bleed valve is open (solenoid non energized).	The engine bleed valve is closed (solenoid energized).

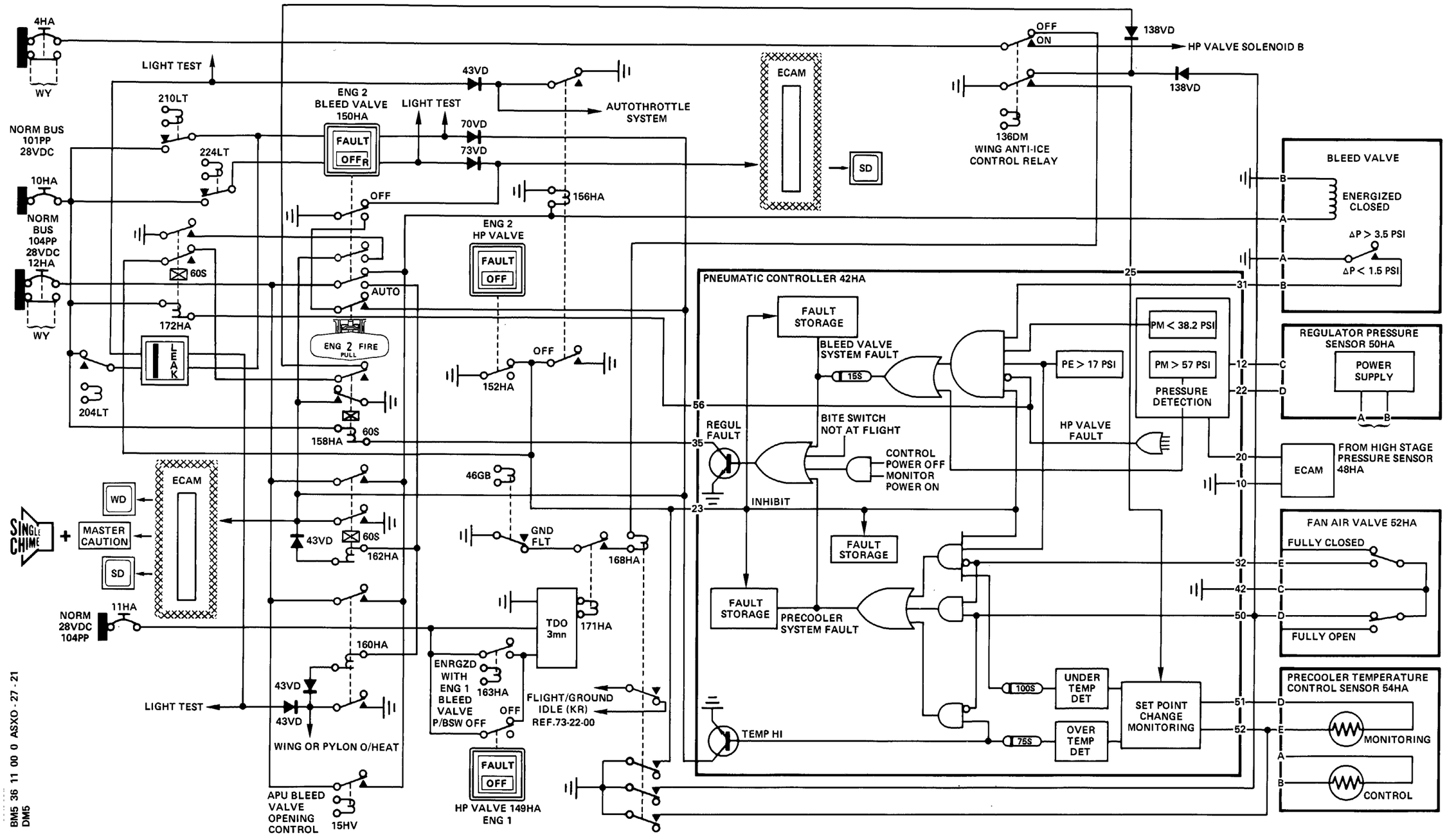
R (2)Illumination warning light :
R **FAULT** amber warning legend on with **ECAM** system activated.
. **MASTER CAUTION** lights come on on **CAPT** and **F/O** main instrument panels


ACTUATOR BODY ASSEMBLY
SENSITIVE SWITCH ASSEMBLY (ELECTRICAL RECEPTACLE)
REVERSE FLOW CHECK MECHANISM
TEST PORT C
TEST PORT N
SOLENOID VALVE ASSEMBLY
P_M PRESSURE TRANSMITTER SENSING CONNECTION
ACTUATOR
REFERENCE REGULATOR SERVO
HEAT SHIELD
REFERENCE PRESSURE REGULATOR
VALVE BODY ASSEMBLY
FILTER ASSEMBLY AND TEST PORT B
DOWNSTREAM PRESSURE SENSING CONNECTION (SERVO AND ACTUATOR FEEDBACK)
MANUAL OVERRIDE AND VISUAL POSITION INDICATOR MECHANISM
BM5 36 11 00 0 ANMO DM5

Bleed Valve - Perspective View
Figure 009

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BM5 36 11 00 0 ASXO - 27 - 21
DM5

Bleed Valve - Electrical Schematic
Figure 010

3VU and 5VU.
. Single chime.
. On the left ECAM display unit : display of the warning and its associated actions.
. On the right ECAM display unit : display of the AIR BLEED page.
- Overheat at the precooler outlet :
. 207°C with wing ice protection system off.
. 255°C with wing ice protection system off and in flight with one air bleed inoperative.
. 255°C with wing ice protection system on.
- failures of pressure regulation sensed by the pneumatic controller and late illumination of the legend after a 60 second delay :
* PR pressure < 38 psig and differential pressure, upstream less downstream (internal Δp) > 3.5 psig.
* PR pressure > 57 psig.
- failures of temperature regulation sensed by the pneumatic controller and late illumination of the legend after a 60 second delay :
* insufficient temperature at the precooler outlet (TR) with the fan air valve not fully closed
i.e. : TR < 153°C with wing ice protection system off
TR < 200°C with wing ice protection system off and in flight with one air bleed inoperative.
TR < 200°C with wing ice protection on.
* excessive temperature with the fan air valve not fully open
i.e. : TR > 207°C with ice protection system off,
TR > 255°C with ice protection system off and in flight with one air bleed inoperative.
TR > 255°C with ice protection system on.
* pneumatic controller BITE TEST selector switch not in FLIGHT position
* failure of fan air valve switches (fully open and fully closed)
* pneumatic controller monitoring power ON and control power OFF.
. Results : Closing of the bleed valve.
. Actions :
- to confirm bleed valve closing by pressing BLEED VALVE pushbutton switch (OFF/R) (this also closes the HP valve).
- to use crossfeed, if necessary.
FAULT legend goes off :
. when the overheat condition has disappeared
. by inhibition after closing of the above mentioned valves (except in case of overheat).
LEAK legend on (amber) with ECAM system activated : MASTER CAUTION lights flash on CAPT and F/O main instrument panels 3VU and 5VU accompanied by single chime.
Configuration corresponding to ambient overheat in the surrounding area of air ducts located in pylon or wing.
This warning closes the corresponding bleed valve.

(3)Inhibition of failures and warnings
To prevent triggering of spurious warnings at air bleed system closing (BLEED VALVE pushbutton switch released out - OFF/R legend on-) or at HP air bleed system closing (HP VALVE pushbutton switch released

out - OFF legend on-), bleed valve ΔP switch, fan air valve opening/ closing switch and air bleed under temperature detection failures of the operating air bleed system are inhibited.
When the aircraft is in flight configuration, with wing ice protection off and one air bleed system inoperating, the bleed valve ΔP switch, the fan air valve opening/closing switch and the undertemperature detection failures of the operating air bleed system are inhibited by closing air bleed (BLEED VALVE pushbutton switch released (out) - OFF/R) or HP air bleed (HP VALVE pushbutton switch released (out) - OFF) of the other system (system inoperating).
In flight, when the previously closed system is opened, the inhibition remains effective during 3 minutes in order to avoid triggering of a false warning.

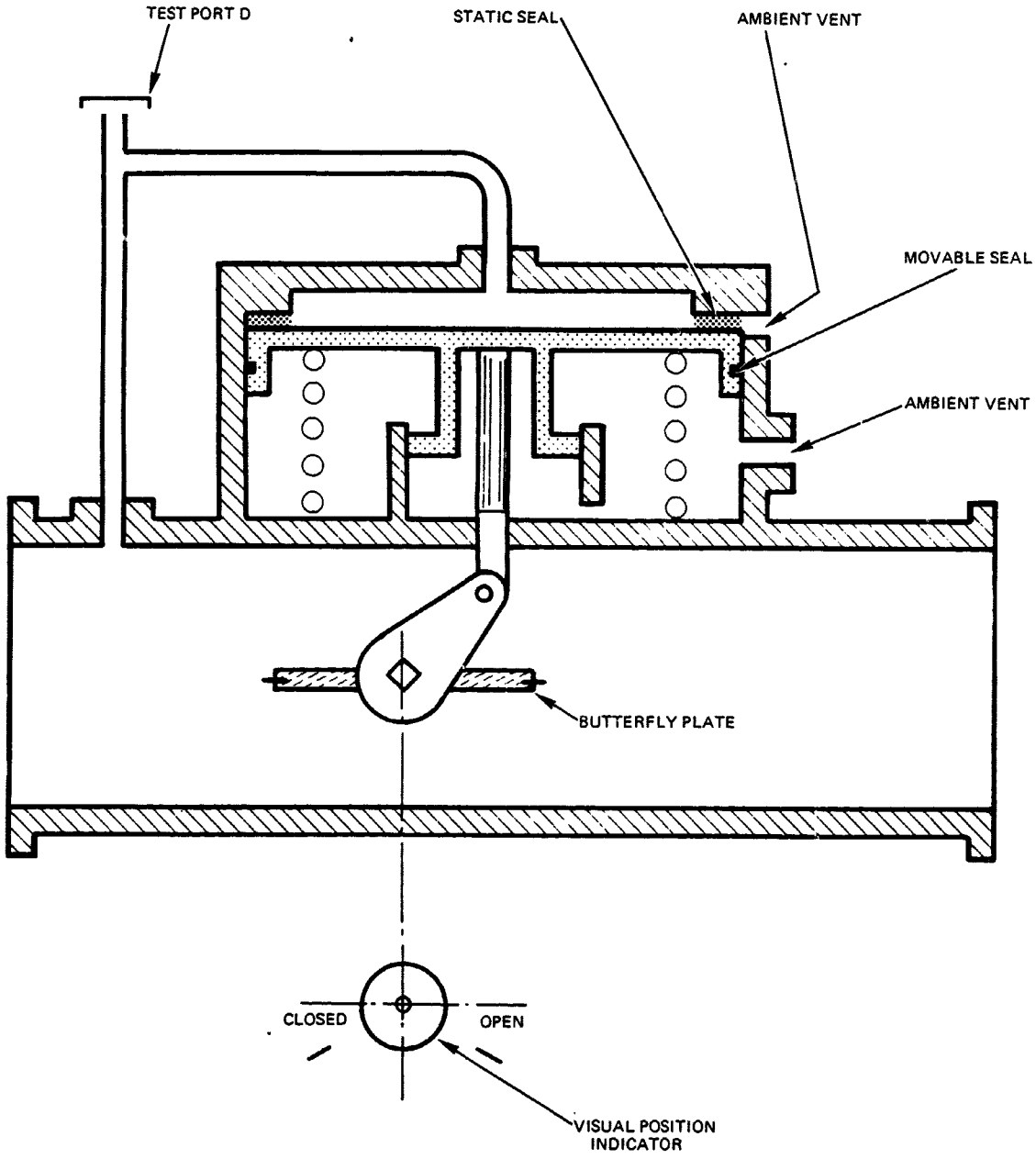
(4) Control of engine minimum idle increase
In order to obtain air pressure sufficient to supply the air conditioning system when the aircraft is in descent and one air bleed system operating, the engine minimum idle is automatically transferred to flight idle (Ref. 73-22-00, P. Block 1).

(5) BLEED VALVE pushbutton switch released (out)
- Indicating : OFF/R legend on (white), FAULT legend off. This configuration corresponds to valve closing control (solenoid energized). This action also controls associated HP valve closing.
- Warning : FAULT legend on (amber) with ECAM system activated. (PR > 57 psig) and late illumination of legend with a 60 second delay.
- Action : To confirm associated HP valve closing control by pressing HP VALVE pushbutton switch (OFF).

D. Overpressure Valve

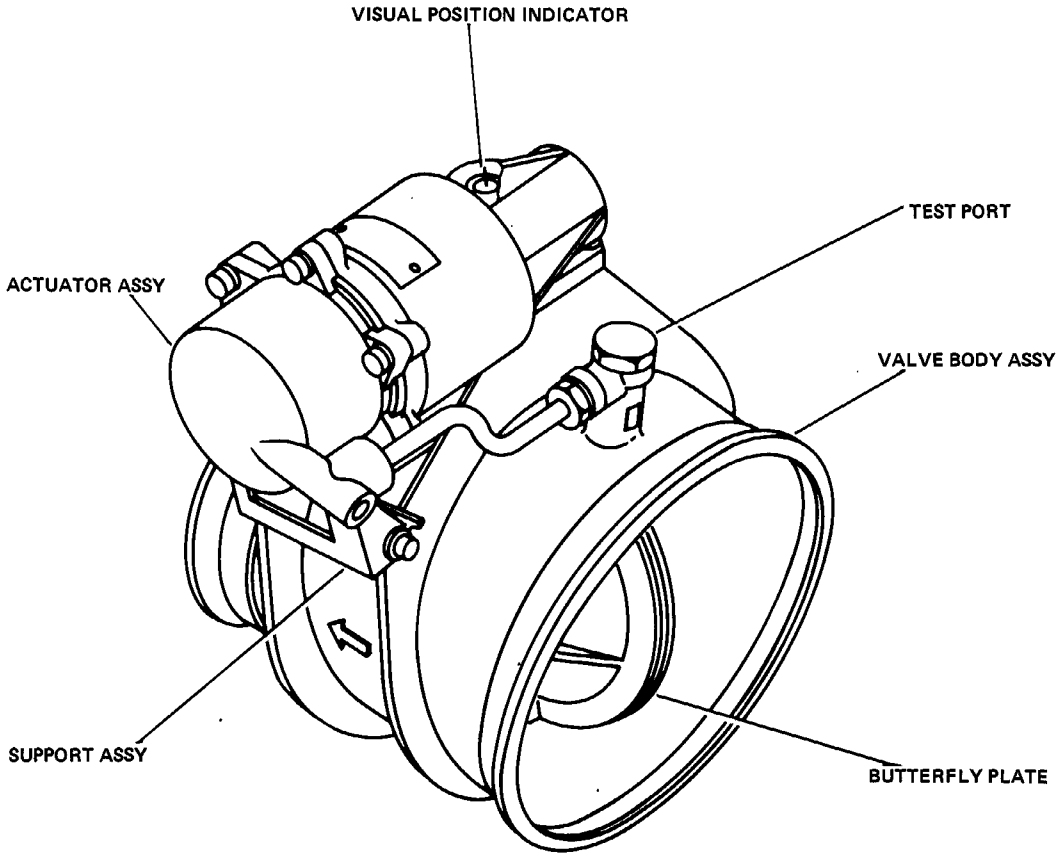
- Function : the valve reduces engine bleed air pressure in the event of pressure regulation failure and cuts off air supply as soon as pressure exceeds a preset value.
- Operation : the valve is of the butterfly type, 6 in. dia., fully pneumatically operated. Under normal conditions, the valve is spring-loaded open by the pneumatic actuator. When upstream pressure reaches a preset value, the load exerted on the piston overcomes the spring load and the valve starts to close.
  The valve is set to start closing within 74 to 79 psig upstream pressure. If pressure increases, the valve continues to close and reduces downstream pressure. The valve is fully closed for a 90 psig upstream pressure.
  Once closed, the valve will open again only for an upstream pressure lower than or equal to 40 psig.
- Emergency control, safety devices and indicating
  . no manual control is provided
  . a butterfly visual position indicator is installed on the butterfly plate.

(Ref. Fig. 011)
(Ref. Fig. 012)



BM5 36 11 00 0 AXMO

Overpressure Valve - Schematic
Figure 011



BM5 36 11 00 0 BAMO
DM5

Overpressure Valve - Perspective View
Figure 012

5. Temperature Regulation and Limitation

A. Description and Operation

- Under stabilized conditions, this system limits temperature in downstream system to a level compatible with the following conditions :
  . safety dictated for air systems routing out of the fire zones,
  . design and performances of the refrigeration unit packs and the wing ice protection system
  . adaptations to engine starting conditions.
- Under all transient conditions, the temperature regulation system should not respond too rapidly, so that the overheat safety system does not trigger, particularly in the following cases :
  . IP - HP bleed air transfer, associated to a rapid engine speed decrease
  . rapid engine speed increase
  . rapid increase of conditioning air flow
  . opening of the wing ice protection system.

To meet such conditions bleed air flows through an air to air heat exchanger located downstream of the overpressure valve, on the upper part of the engine pylon. This air to air heat exchanger is called precooler : the precooler is a tubular steel assembly with crossflow air routing configuration.

The precooler cools the hot air from the engine compressor by a heat exchange process, using cold air bled from the engine fan.

Engine bleed air temperature regulation is achieved by controlling the air flowrate from the engine fan by means of the fan air valve. This is a temperature regulator butterfly valve, pneumatically operated and electrically controlled. The valve is controlled by the pneumatic controller which receives electrical signals from a temperature control sensor located downstream of the precooler.

Cooling air is ducted through the precooler and then discharged overboard through holes drilled in pylon outer face.

The regulated temperature value varies, depending on whether the wing ice protection system is operating or not and whether one air bleed is inoperative or not.

. with wing ice protection off :
  regulated temperature : 177°C ±12°C (350°F ±21°F)
. with wing ice protection on or one air bleed inoperative :
  regulated temperature : 227°C ±12°C (441°F ±21°F).

The muscle pressure of the fan air valve is tapped upstream of the bleed valve and is limited by a relief valve ; the relief valve is closed as long as upstream pressure is lower than 163 psig.

When subjected to muscle pressure and with no current applied to the torque motor, the fan air valve is open to allow maximum cooling of conditioning air ; in the absence of muscle pressure, the valve is spring-loaded closed.

The electrical signals transmitted from the sensor to the pneumatic controller are transformed so that :

. the valve is fully closed for regulation of lower limits (165°C or 215°C)
. the valve is fully open for regulation of upper limits (189°C or 239°C).

The temperature control sensor located downstream of the precooler includes two sensing elements generating signals : one for temperature regulation (as above mentioned), the other for overheat detection and fault detection. Therefore, when the temperature at the precooler outlet is excessive, signals are fed to the pneumatic controller which commands air bleed automatic shut off by closing of the bleed valve.
Precooler overheat temperature varies depending on whether the wing ice protection system is operating or not.

. With wing ice protection off : overheat at 207°C ±3°C.
. With wing ice protection off and in flight with one air bleed inoperative : overheat at 255°C ± 3°C.
. With wing ice protection on : overheat at 255°C ± 3°C.

B. Fan Air Valve

. The valve is of the butterfly type, 8 in. dia., pneumatically operated and electrically controlled by a torque motor which can modify the muscle pressure according to the signals transmitted from the controller.
The fan air valve is designed to control the cooling airflow ducted through the precooler in order to limit and to regulate the engine bleed air temperature.

. Opening and regulation
Control air tapped upstream of the bleed valve is routed through a filter to the pilot regulator assembly which delivers constant pressure to the servo pressure regulator and the feedback servo. Control pressure enters the actuator upper chamber and, when upstream pressure exceeds 20 psig, enables the actuator diaphragm to overcome the actuator spring force, thus causing the butterfly to open.
The servo pressure regulator is set at a pressure lower than that of the pilot regulator assembly, to enable valve operation when pressure decreases below the normal setting of the pilot regulator assembly.

- When the current applied to the torque motor is null or lower than 5 mA, control pressure is at its maximum and the valve is fully open.
- When power is supplied to the torque motor, the flapper is positioned away from the supply nozzle, thus creating a pressure in the feedback servo, proportional to the current applied to the torque motor. This pressure acting on the feedback servo diaphragm overcomes feedback servo spring force and causes the flapper to move away from the feedback servo nozzle. This movement reduces the supply pressure in the actuator upper chamber by venting pressure to ambient, thus causing the butterfly plate assembly to move towards the closed position. The butterfly plate movement towards the closed position, positions the flapper towards the feedback servo nozzle again and increases the force on the feedback spring until the feedback spring balances the force increase due to the increase in torque motor current. Therefore, the butterfly plate assembly has a unique position for each value of current applied to the torque motor.

A lever system between the actuator and the butterfly reduces the passage area variation rate in order to improve stability when valve position is near to closed.

. Closing
In the absence of muscle pressure, the valve is spring-loaded closed.

When the current applied to the torque motor exceeds a preset value (1200 mA), the flapper moves fully away from the supply nozzle, creating such a force in the feedback servo mechanism that the actuator upper chamber is permanently vented ; the valve closes under the load exerted by the actuator spring.

. Emergency control, safety devices and indicating
The valve incorporates a manual override which consists of a hex head which lifts a ball from its seat by means of a rod, thus venting supply pressure and resulting in full closing of the valve. The valve is therefore locked in closed position.
A relief valve limits muscle (supply) pressure entering the valve and causes air to flow back to aircraft air supply system. The relief valve delivers 1.8 lb/mn at 190 psig and 30°C ±50°C and remains closed as long as upstream pressure is lower than 163 psig.
A small quantity of cooling air is admitted into the pneumatic actuator for ventilation purposes.
Two limit position microswitches are actuated by an actuator arm attached to the butterfly shaft and transmit information to the controller.
The manual override incorporates a valve butterfly position indicator.
The valve is provided with a test port to perform the in situ test.
(Ref. Fig. 013)
(Ref. Fig. 014)

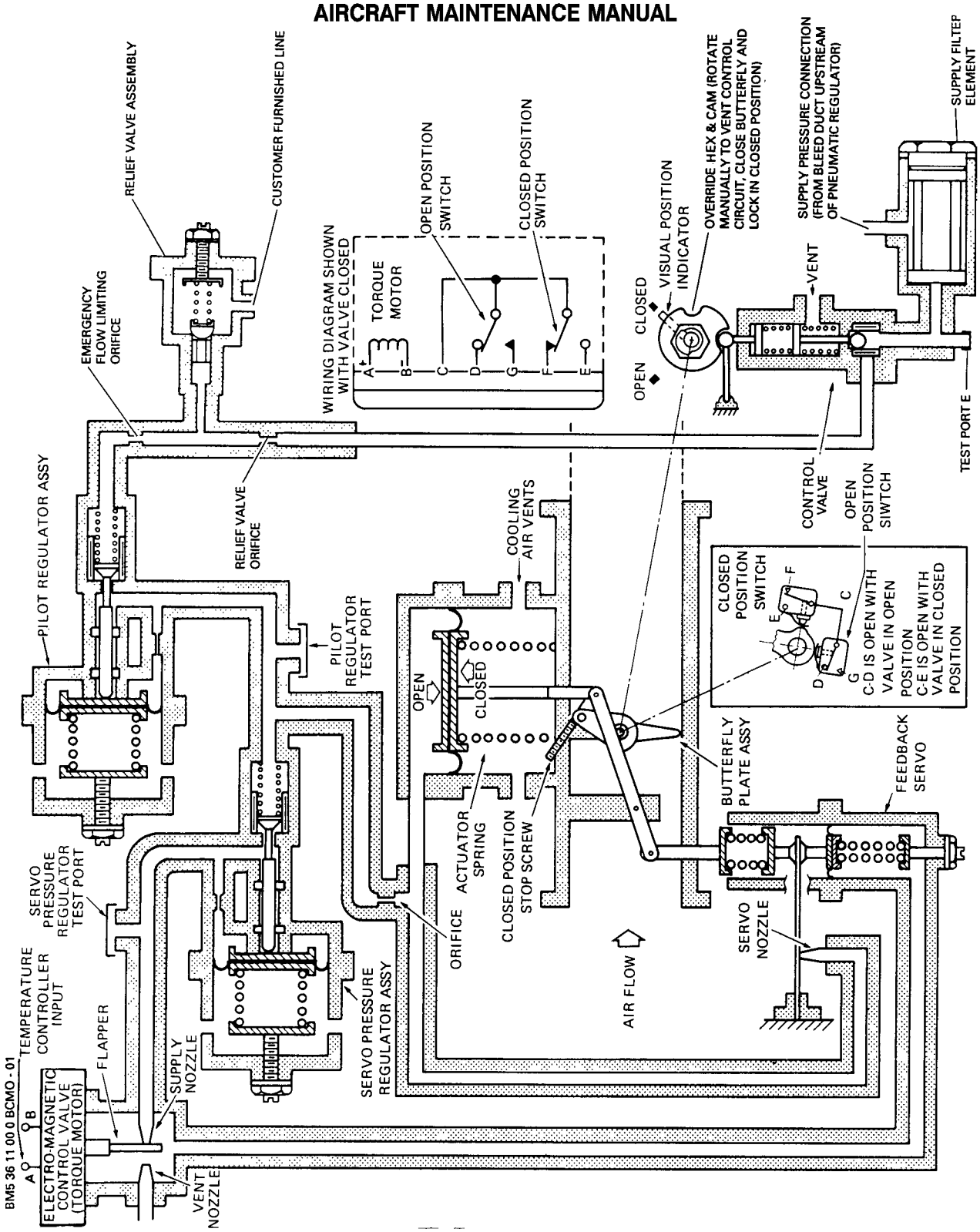
**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

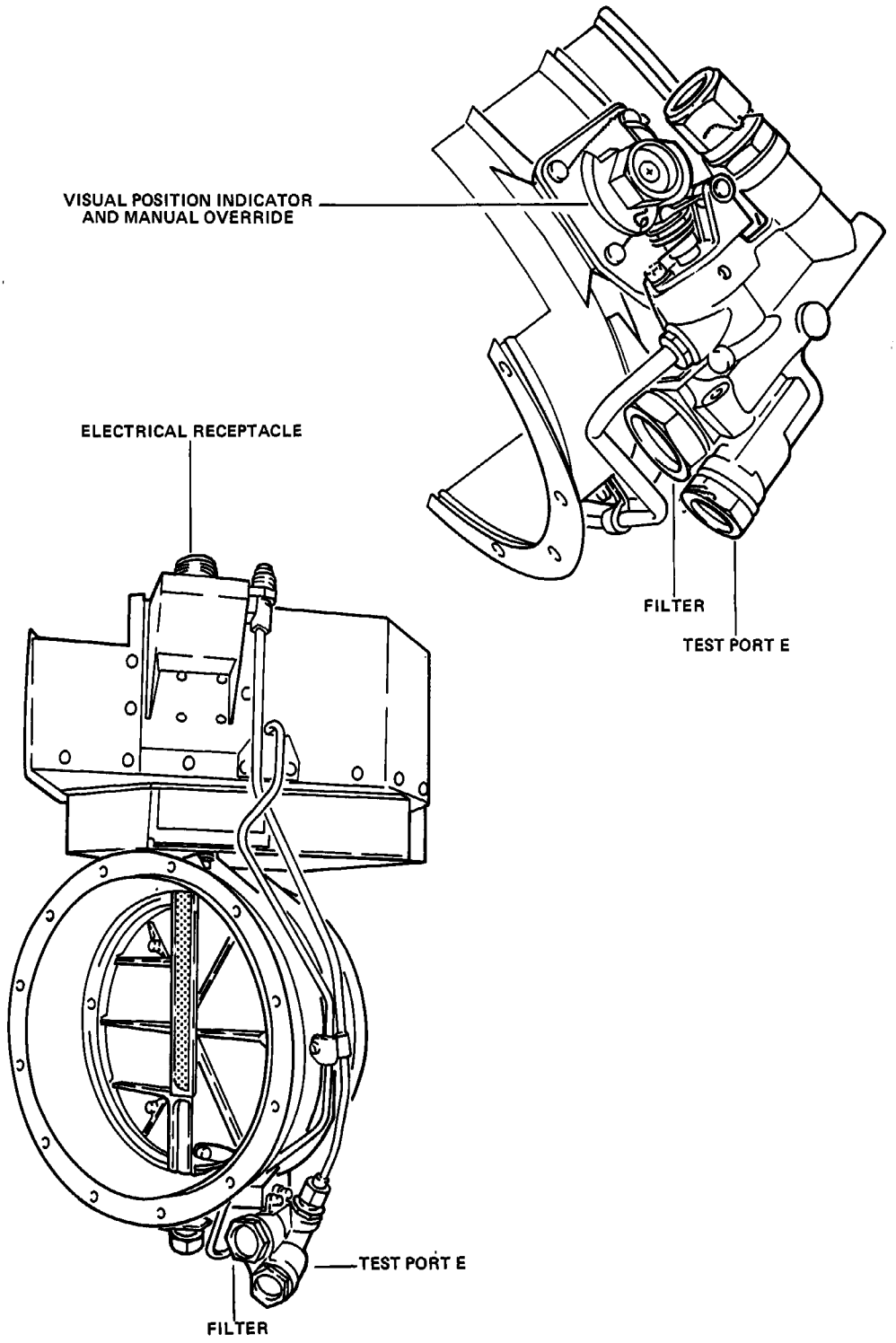
(Ref. Fig. 015)

**ON A/C 101-200,

C. Control of Temperature Regulation
Operation of temperature regulation at the precooler outlet, already described in paragraph 4.A., is schematized .
(Ref. Fig. 016)

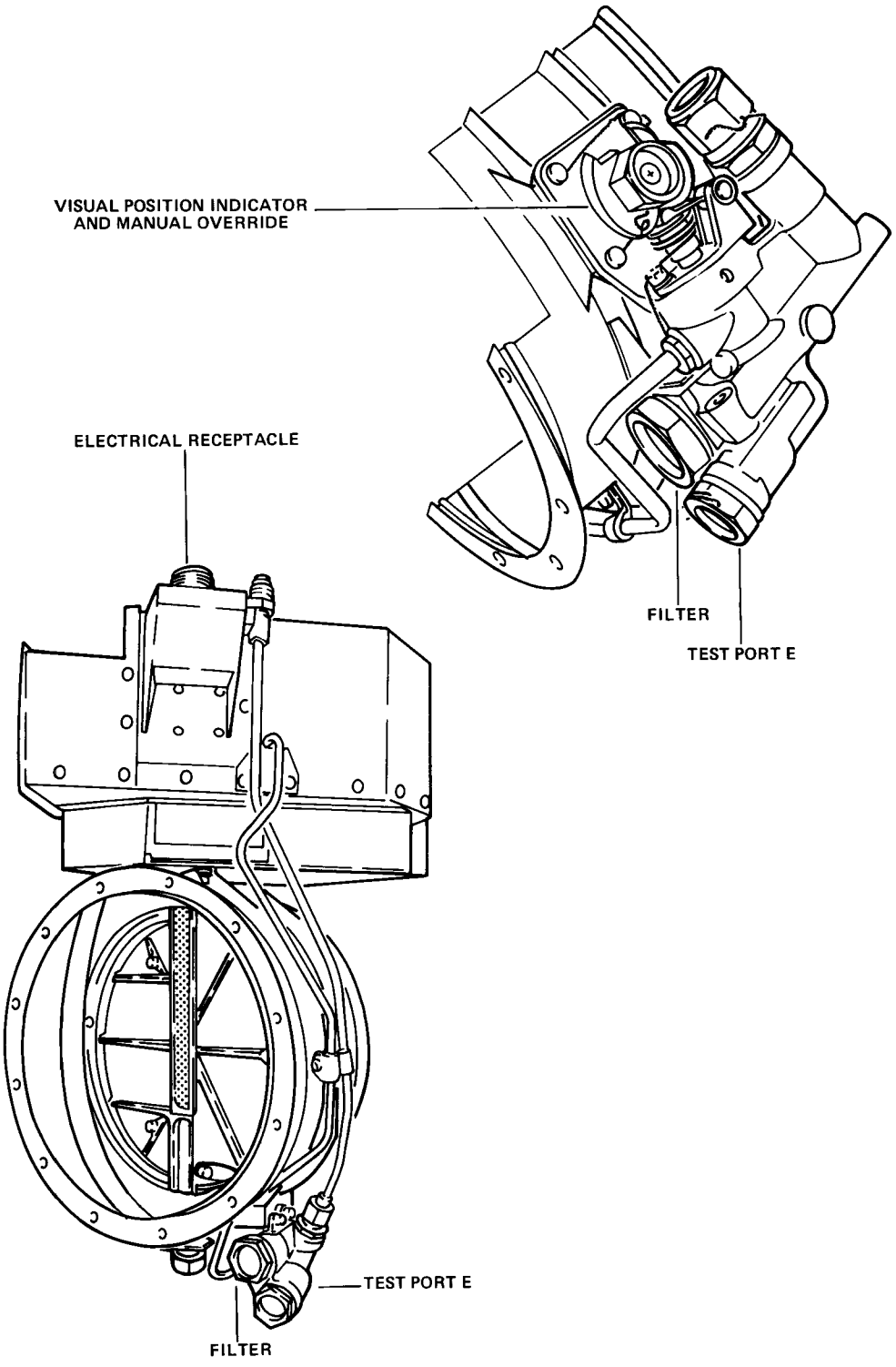


Fan Air Valve - Schematic
Figure 013



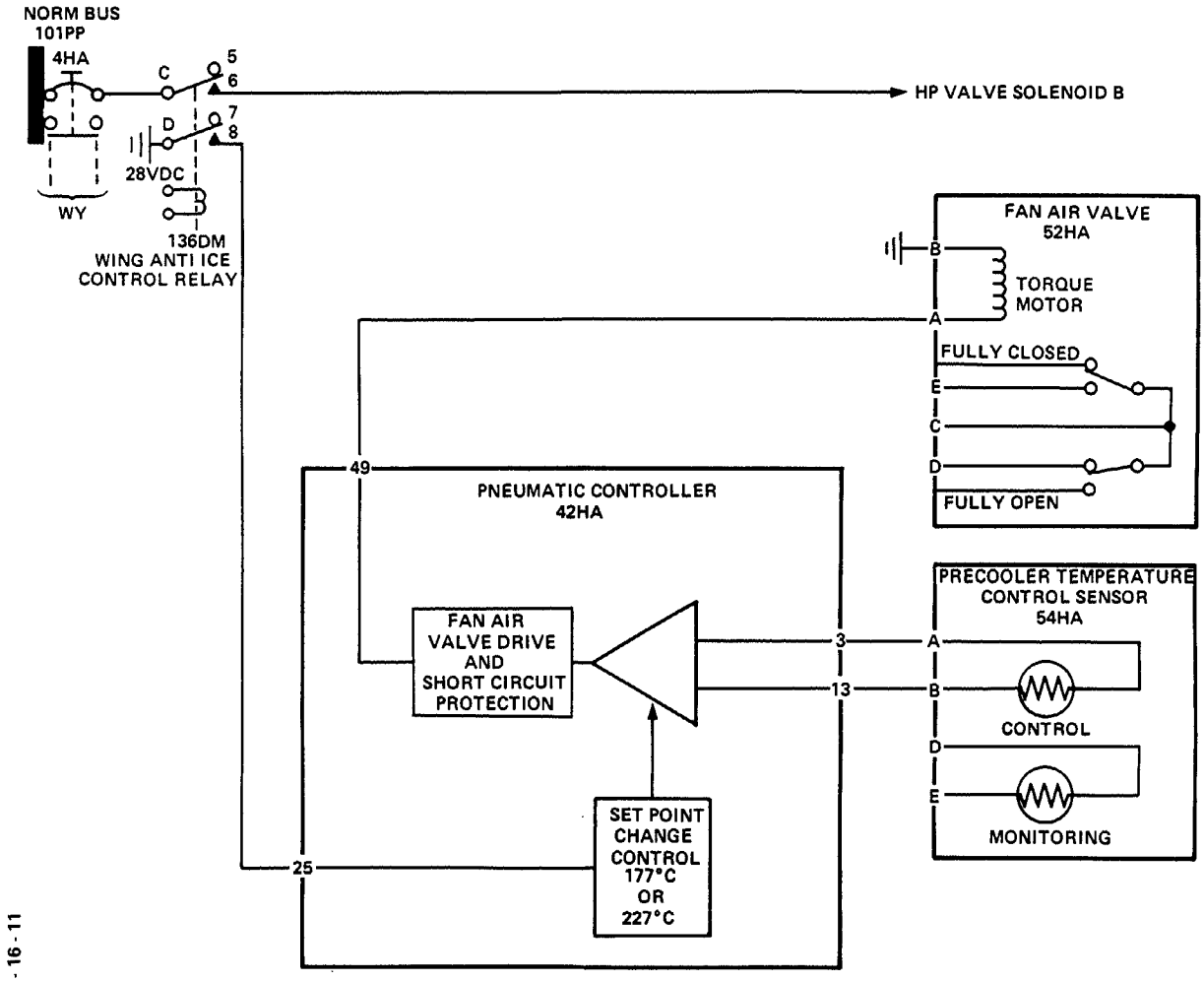
BM5 36 11 00 0 BEMO
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Fan Air Valve - Perspective View
Figure 014



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Fan Air Valve - Perspective View
Figure 015



BM5 36 11 00 0 BGMO-16-11
DM5

Fan Air Valve - Electrical Schematic
Figure 016

6. Fault Detection and Isolation of Pressure and Temperature Regulation Systems - Test Devices

A. Description and Operation

The purpose of this system is to detect failures and abnormal operation of the engine bleed air supply system and to warn the crew by transmitting the relevant information to the right and left ECAM display units and by triggering annunciator light illumination.
The system also enables failures and abnormal operation to be recorded during flight, in order to facilitate replacement on the ground of faulty components. Moreover, systematic check of each component can be performed on the ground.
The system related to each engine includes :

- a Chromel Alumel high stage temperature sensor (TE)
- a high stage pressure sensor (pressure upstream of the HP valve) (PE)
- a regulator pressure sensor (pressure downstream of the bleed valve) (PR)

R

- an electronic assembly integrated in the pneumatic controller which processes information from these components, from HP valve closing limit microswitches, from bleed valve differential pressure switch (upstream pressure less downstream pressure) and from fan air valve opening and closing limit microswitches.
  A section of the electronic assembly generates signals to trigger illumination of the annunciator lights.
  Another section of the controller designated BITE (Built In Test Equipment) includes a non volatile memory and facilitates on the ground failure identification and check of components under maintenance. (Ref. paragraph 5.B.).

R

- a selector switch and PTT pushbutton switch located on the maintenance panel are designed to check continuity of BLEED FAULT warning circuit

Continuity initiates illumination of annunciator lights, activation of the ECAM system (chime and AIR warning light), discontinuity of the flowline on the overhead panel.
Upon test completion the system must be reset (BLEED VALVE pushbutton switch released out (OFF/R)).

B. Operation with Engine Bleed Air Supply

In flight, the electronic assembly monitoring the engine bleed air system detects failures of the various components and warns the crew by illumination of one of the two legends in the flight compartment :
FAULT legend of HP VALVE pushbutton switch or of BLEED VALVE pushbutton switch, as per a logic diagram already described in paragraphs 2.C and 3.C.

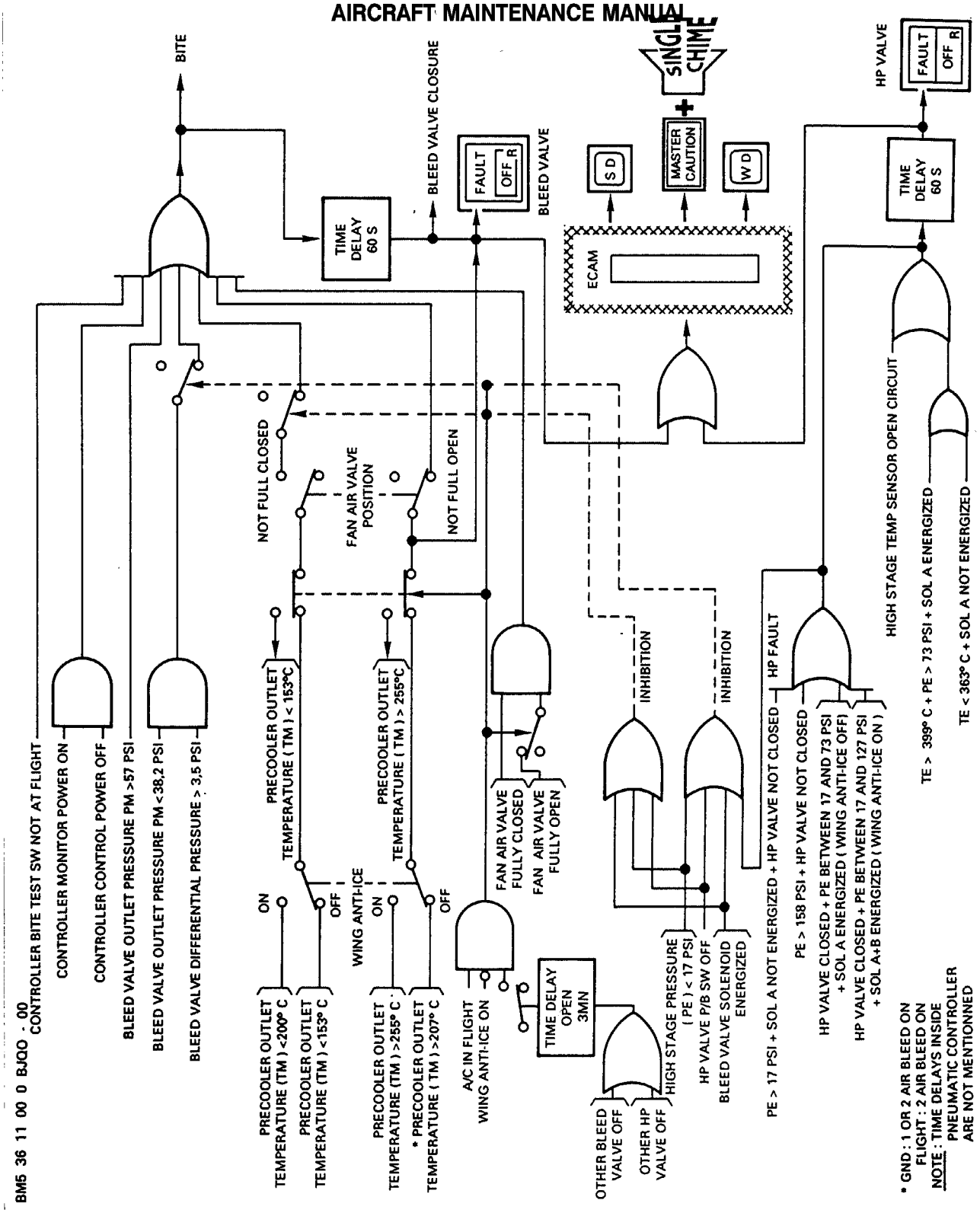
R

Failures of pneumatic or mechanical origin, i.e. which cannot be isolated

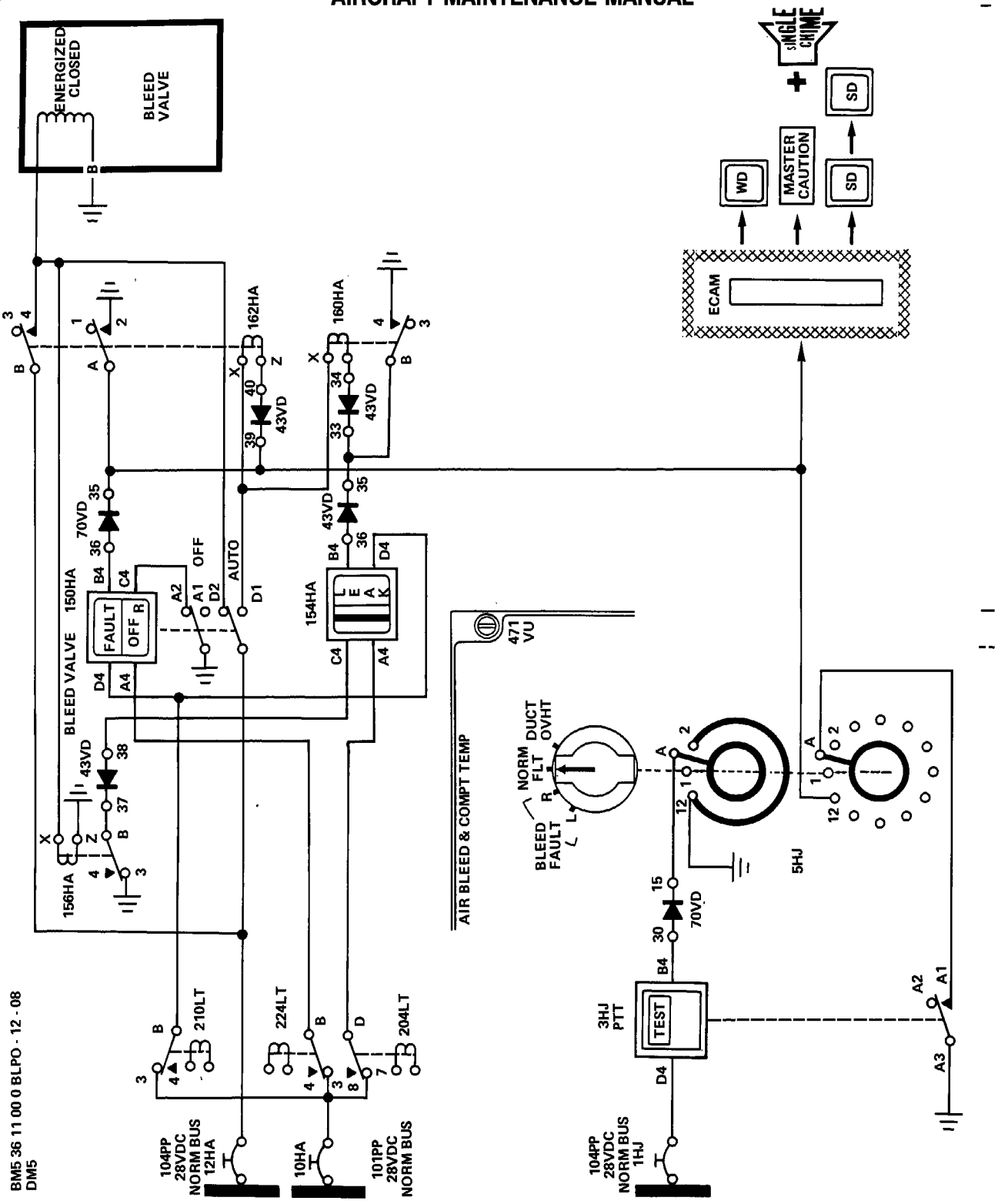
on the ground by simple electrical tests, are recorded in the non volatile memory of the **BITE**, for interrogation on the ground by the maintenance personnel, without using a pneumatic air source.

R

Failures associated with illumination of **FAULT** legend on **HP VALVE** pushbutton switch are recorded in the memory circuits of the **BITE** after a 60 second time delay when wing anti-ice is not selected.
(Ref. Fig. 017)
(Ref. Fig. 018)



Engine Bleed Air Warning Logic
Figure 017



Bleed Fault Test
Figure 018

C. Description and Operation of the BITE

(1)Description

R

(Ref. Fig. 019)

R

The pneumatic controller incorporates a built-in-test for checking correct operation of the computer, ensuring the monitoring of the computer and of the engine bleed air system.
The built-in-test operation is ensured by microprocessor based circuitry which includes :
- Central processing unit
- Hardware/Software interface for the analog inputs
- Hardware/Software interface for the discrete inputs
- Continuous control hardware built-in-test capability
- Continuous system hardware built-in-test capability
- Fault storage and display
- Watchdog refresh capability
- Power supply monitor

To access to the built-in-test the front panel of the pneumatic controller contains a 16 alphanumeric character display for displaying faults and four pushbutton switches. Pushbuttons allow the stored fault information to be cycled on the display for review by the maintenance personnel. The display is normally off unless the controller is commanded into initiated built-in-test by pressing one of the pushbuttons while the aircraft is on the ground.
The four pushbuttons operate the display and memory erase functions. The four pushbuttons are labeled **SCROLL, SELECT, TEST** and **CLEAR MEMORY.**
The front panel also includes a red light labeled **CONTROLLER FAULT** to indicate a **CPU** failure.

(2)Operation

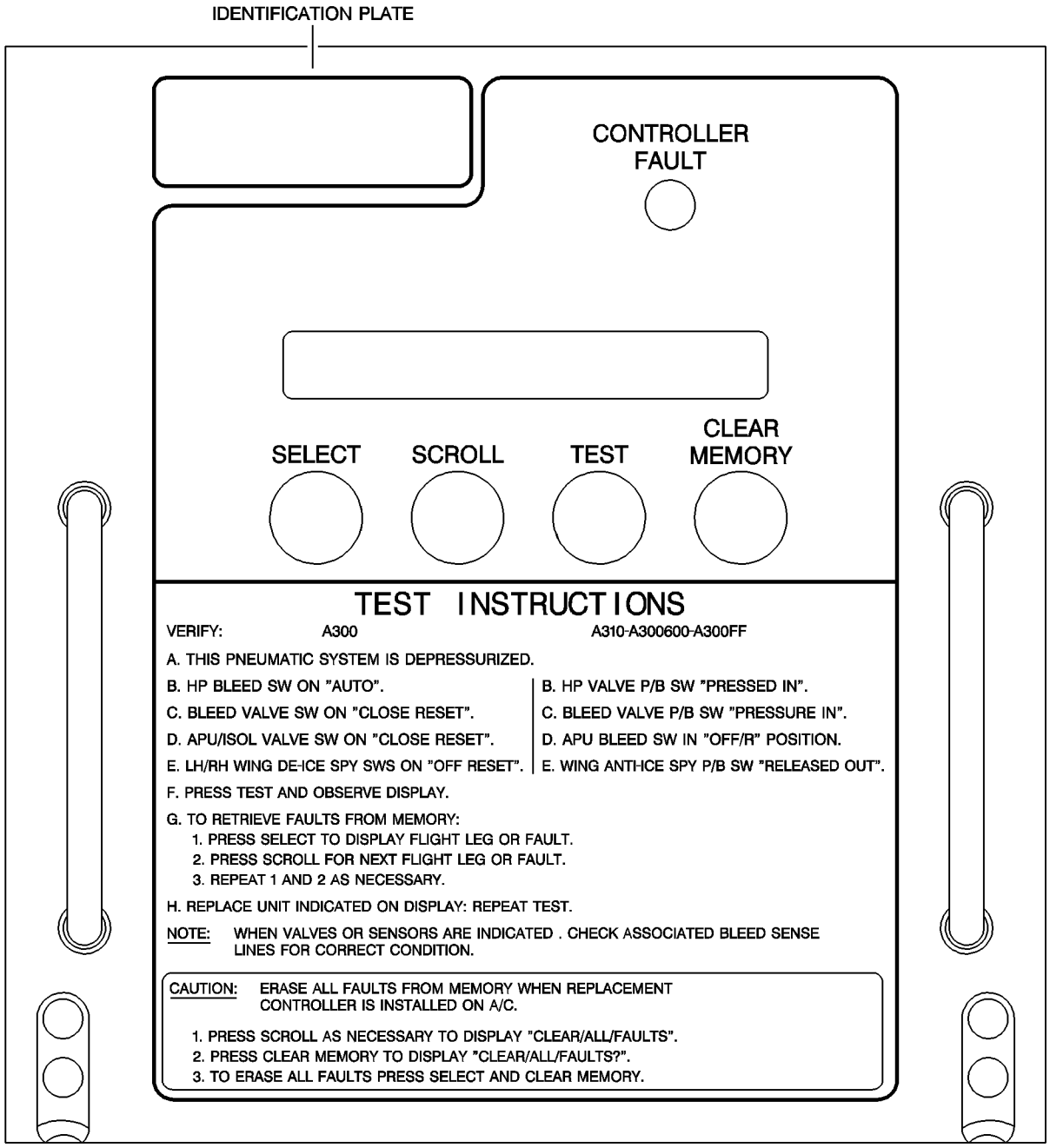
3 different tests are performed by the pneumatic controller
- Power-up test
- Continuous built-in-test
- Initiated built-in-test

(a)Power-up test

Power-up test is performed upon the application of the electrical power to the aircraft.
Power-up test is a subset of continuous built-in-test, performing a self test of the power supplies, Central Processing Unit, and the memory circuits prior to allowing the processor to perform its functions.
If power-up test is not correct, controller fault will be stored in non-volatile memory and the **BLEED VALVE/FAULT** warning light will be illuminated.
The power-up test shall be finished within 4 seconds.

(b)Continuous built-in-test

Continuous built-in-test (**C-BITE**) is only an observer to the system and


IDENTIFICATION PLATE
CONTROLLER FAULT
SELECT
SCROLL
TEST
CLEAR MEMORY
TEST INSTRUCTIONS
VERIFY: A300 A310-A300600-A300FF
A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. HP BLEED SW ON "AUTO".
C. BLEED VALVE SW ON "CLOSE RESET".
D. APU/ISOL VALVE SW ON "CLOSE RESET".
E. LH/RH WING DE-ICE SPY SWS ON "OFF RESET".
B. HP VALVE P/B SW "PRESSED IN".
C. BLEED VALVE P/B SW "PRESSURE IN".
D. APU BLEED SW IN "OFF/R" POSITION.
E. WING ANTI-ICE SPY P/B SW "RELEASED OUT".
F. PRESS TEST AND OBSERVE DISPLAY.
G. TO RETRIEVE FAULTS FROM MEMORY:
1. PRESS SELECT TO DISPLAY FLIGHT LEG OR FAULT.
2. PRESS SCROLL FOR NEXT FLIGHT LEG OR FAULT.
3. REPEAT 1 AND 2 AS NECESSARY.
H. REPLACE UNIT INDICATED ON DISPLAY: REPEAT TEST.
NOTE: WHEN VALVES OR SENSORS ARE INDICATED . CHECK ASSOCIATED BLEED SENSE LINES FOR CORRECT CONDITION.
CAUTION: ERASE ALL FAULTS FROM MEMORY WHEN REPLACEMENT CONTROLLER IS INSTALLED ON A/C.
1. PRESS SCROLL AS NECESSARY TO DISPLAY "CLEAR/ALL/FAULTS".
2. PRESS CLEAR MEMORY TO DISPLAY "CLEAR/ALL/FAULTS?".
3. TO ERASE ALL FAULTS PRESS SELECT AND CLEAR MEMORY.

BM5 36 11 00 0 SLQ0 00

Pneumatic Controller - Front Face
Figure 019

provides no control of the system.
C-BITE is active during normal operation of the pneumatic controller whenever electrical power is applied and power built-in-test is successfully completed. All valve, sensor, and controller components in the pneumatic system are subject to continuous testing.
Confirmed faults are stored in non-volatile memory.
During C-BITE the following tests are performed :
- program memory test
- Power Supply test
- Analog to digital conversion test
- high pressure bleed valve solenoid A driver short circuit test
- high pressure bleed valve solenoid A driver open circuit test
- fan air valve drive open circuit test
- fan air valve drive short circuit test
- TE sensor interface test
- TM control sensor interface test
- TM monitor sensor interface test
- Setpoint logic test

(c)Initiated built-in-test (Ref. Fig. 020)
The initiated built-in-test (I-BITE) capability is provided in the built-in-test state. Its purpose is to provide active fault detection for selected parts of the pneumatic controller.
The I-BITE starts when the TEST pushbutton on the front face of the pneumatic controller is pressed. At the start of the I-BITE, all of the front panel display are turned on for 5 seconds. At the same time a zero pressure check test is performed. If either PM (downstream precooler pressure) or PE (high stage pressure) is greater than 10 psig the system is considered pressurized and I-BITE will abort. If no pressure is detected during the zero pressure check test, then the aircraft engine type will be displayed on the front panel for 5 seconds, followed by the pneumatic controller part number for 5 seconds. Following this, the I-BITE capability will perform 9 tests in the sequence specified below :

Test sequence	Fault Message displayed
Pressure Sensor Interface Test	CONTROLLER
PE Zero Pressure Test	HI PRESS SNSR
PM Zero Pressure Test	REG PRESS SNSR
TM Monitor Undersupply Test	CONTROLLER
TM Control Functioning High Test	CONTROLLER
TM Control Functioning Low Test	CONTROLLER
FAV Torque Motor Winding Open Circuit Test	FAN AIR VALVE
Solenoid A Driver Open Circuit Test	CONTROLLER

Test sequence	Fault Message displayed
Solenoid A Driver Short Circuit Test	CONTROLLER

If all tests in the I-BITE capability pass, the message TEST OK is displayed.
At the first detected failure, the I-BITE capability asserts the appropriate faulty component.
The I-BITE shall be finished within 40 ± 4 seconds

(d)Fault storage capability

The fault storage capability is provided in the built-in-test. This capability causes fault messages to be stored in the non-volatile memory.
5 sets of fault records can be stored in the non-volatile memory, one for the current flight leg and 4 for the last 4 flight legs prior to the current flight leg. When a new flight leg is detected, the fault storage capability shifts each set of fault records into the previous flight leg record and, if 4 sets of fault records have already been stored, discards the fault record for the oldest flight leg.
A new flight leg is detected when both the high stage and the downstream precooler pressures are less than or equal to 15 ± 2 psig for at least 60 ± 6 seconds, then change to greater than 15 ± 2 psig for at least 60 ± 6 seconds.
If a fault is detected by the continuous built-in-test, the corresponding fault message is stored in the non-volatile memory.

(e)Front panel display

By using two eight character display segments configured in a single row of 16 characters, the following is achieved :

- the first character indicates the flight leg with C indicating the current flight and 1 through 4 indicating the previous one to four flights.
- the second character is a blank.
- the remaining thirteen characters will displayed the failed LRU.

The fault messages are listed in the table below :

Fault Message	Corresponding Fault Data
X CONTROLLER	Controller fault
X HI PRESS SNSR	PE fault
X REG PRESS SNSR	PM fault
X HI TEMP SNSR	TE sensor fault
X REG TEMP SNSR	TM control sensor fault or TM monitor sensor fault
X HP VALVE	HSV closed fault or HSV open fault

Fault Message	Corresponding Fault Data
X FAN AIR VALVE	FAV fault
X PRESS REG VLV	PRV reg low or PRV reg high

NOTE : In the table above "X" is used to indicate the flight leg number, C for the current flight leg and 1, 2, 3, 4 for the previous flight legs, 4 being the oldest.

(f)Front panel pushbutton switches

4 pushbutton switches are provided on the front panel :

1 - **SELECT**

This switch allows the operator to select one of the following modes :

- display current flight leg
- display faults
- clear all faults

2 - **SCROLL**

This switch is used to scroll through the flight leg and to scroll through the fault data to sequencially display all faults of the selected flight leg.

3 - **TEST**

This switch is used to start the initiated built-in-test.

4 - **CLEAR MEMORY**

This switch is used to erase the faults from the non-volatile memory. To clear faults from the memory, process as indicated on the front face of the pneumatic controller :

- press **SCROLL** as necessary to display **CLEAR ALL FAULTS**
- press **CLEAR MEMORY** to display **CLR ALL FAULTS ?**
- to erase all faults press **SELECT** and **CLEAR MEMORY** simultaneously.

When erasure is in progress the message **ERASING** is displayed. When erasure process is finished the message **CURRENT FLIGHT** is displayed.

(g)Setpoint logic change

The pneumatic controller is common for aircraft powered with General Electric engines or with Pratt & Whitney engines. The software is different for the 2 engines types. The software change is provided by a pin programming.

The controller identifies the engine manufacturer installed on the aircraft by display when the initiated built-in-test is performed. **PW ENGINE, GE ENGINE** or **?? ENGINE** when pin programming is not wired, is displayed.

(h)Central processing unit monitoring

The pneumatic controller contains a latch-out capable to proceed to the inhibition of the computer when central processing unit failure is detected.

When central processing unit failure is detected the **CONTROLLER FAULT** red light on the front face is latched and the **BLEED VALVE/FAULT** warning light on panel **436VU** is illuminated.

The reset can be performed after manual switch on/off of the electrical power supply to the controller.

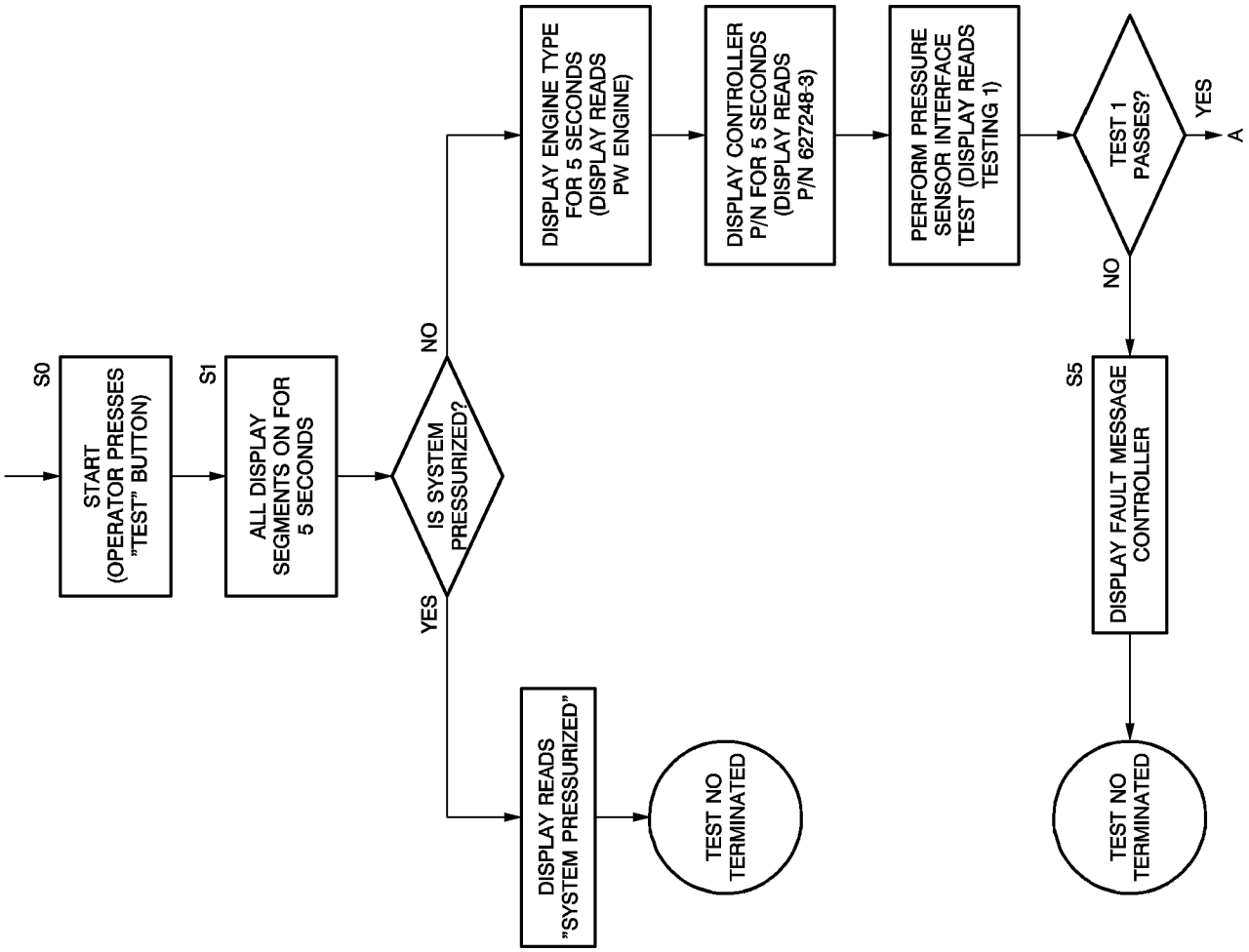
(i)Fault storage reading

The procedure to retrieve faults from memory is described on the front face of the pneumatic controller.

When no fault messages have been stored in the flight leg being accessed the message **NO FAULTS** is displayed.

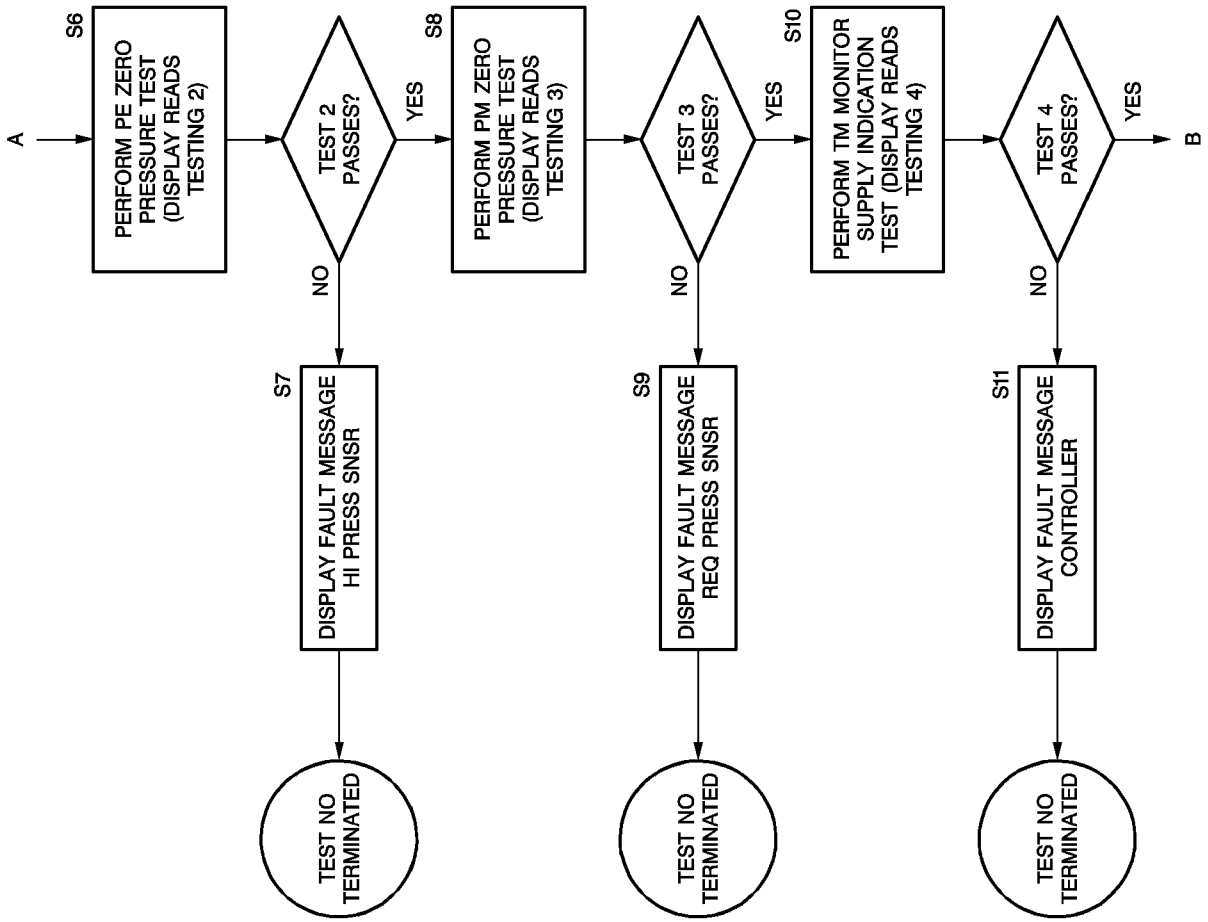
When fault messages have been stored the faulty system LRU will be displayed in the concerned flight leg. By depressing **SCROLL** pushbutton the display message :

- changes to the fault message for the next fault in the list for the same flight leg,
- changes to **NO MORE FAULTS** if the fault message currently displayed is the last of the list,
- changes to the first fault message in the list for the same flight leg if the message **NO MORE FAULTS** is currently displayed.
- does not change if the current message displayed is **NO FAULTS.**



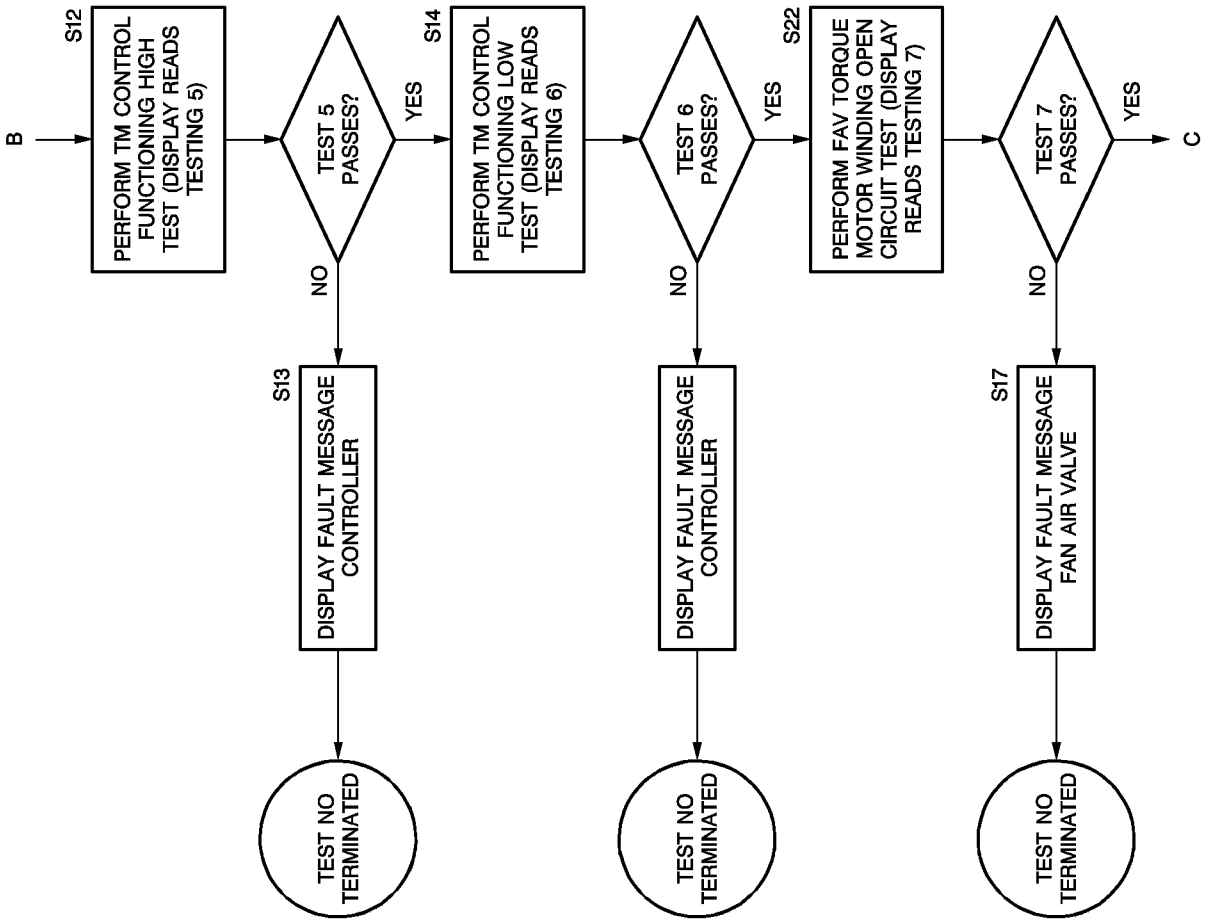
BM5 36 11 00 0 SLRA 00

Initiated Built-in-Test Flow Diagram (Sheet 1)
Figure 020



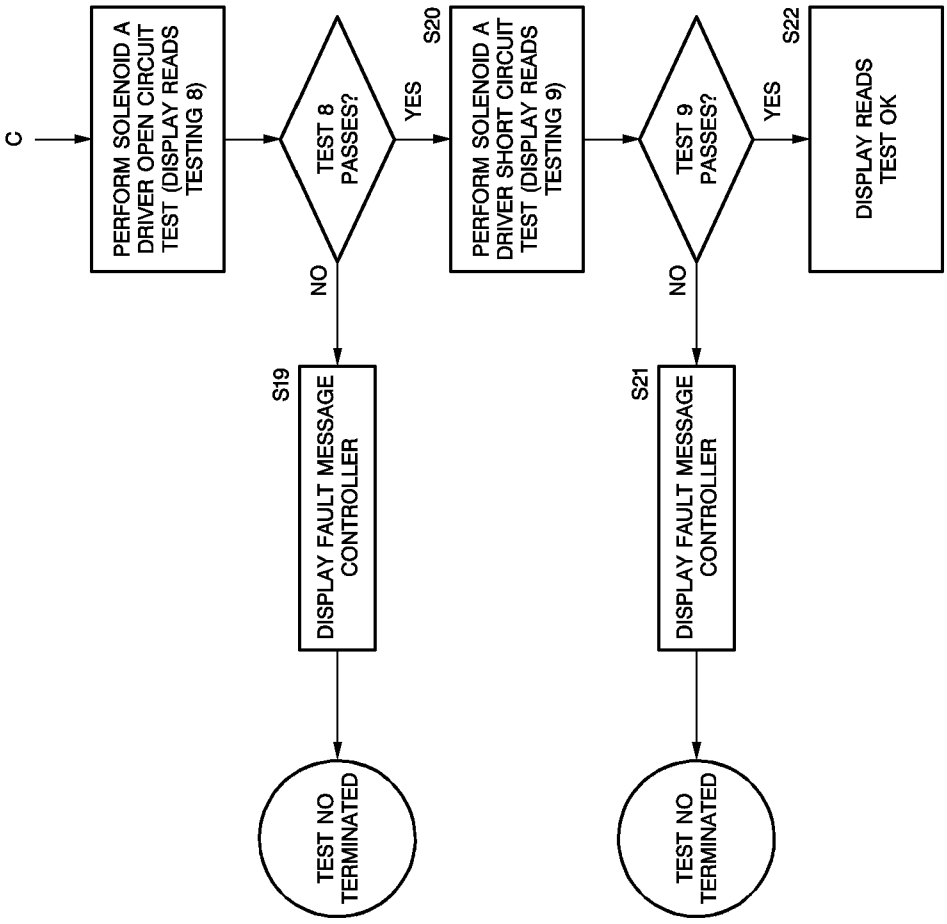
BM5 36 11 00 0 SLRE 00

Initiated Built-in-Test Flow Diagram (Sheet 2)
Figure 020



BM5 36 11 00 0 SLRG 00

Initiated Built-in-Test Flow Diagram (Sheet 3)
Figure 020



BM5 36 11 00 0 SLRJ 00

Initiated Built-in-Test Flow Diagram (Sheet 4)
Figure 020

D. In Situ Pneumatic Test

(1)General description

As a complement to the BITE, tests can be performed to check pneumatic operation of the main pneumatic components installed on aircraft, using in situ test ports provided on these components.

The tests can be performed without pressurizing the aircraft systems and removing components, but using a pneumatic tester on the ground.

(2)Tested components and functions

Component	Tested Functions	Test Ports Used on Component	Test Frequency
HP valve	- Opening at minimum pressure - Transfer (at 85 psig)	A and O 28VDC required	As required
Bleed valve	- Regulation and full opening - Reverse flow check mechanism function	B, N, C No power required	As required
Overpressure valve	- Operation (pressure at beginning of closing, and opening after full closing)	D No power required	5000 hours
Fan air valve	- Operation of relief valve	E No power required	As required

(3)Test devices and procedures

R (Ref. Fig. 021)

R (Ref. Fig. 022)

(a)HP valve inspection/check

Check for correct operation of HP valve low pressure switch.

CAUTION : MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.

1 Check that pneumatic supply pushbutton switches are in OFF position.

2 Place all tester controls in OFF position.

3 Fit an R adapter to test ports A and O.

4 Connect a tee adapter to tester fitting No.1 ; connect test hoses to tee adapter and to adapter R in test ports A and O.

5 Open tester cylinder shutoff valve.

6 Place tester SYSTEM SELECTOR in B position.

7 Place pneumatic supply pushbutton switch of system being tested in AUTO position to energize solenoid A.

NOTE : For test set P/N 290121-4:

- The pneumatic controller for system being tested must be installed.
- 28VDC electrical power on aircraft is required for test.

NOTE : For test set P/N 3792195-1:

- The pneumatic controller for system being tested must be installed.
- 28VDC electrical power on aircraft is required for test and is available on test set.

8 Slowly increase primary gage pressure to 10 psig by means of primary regulator while checking butterfly position indicator. Position indicator should move to full OPEN position at 10 psig.
Record primary gage pressure when position indicator is in full OPEN position.

System 1 HP valve psig
System 2 HP valve psig

9 Slowly increase primary gage pressure to 75 psig. Valve position indicator must remain in OPEN position.

10 Slowly increase primary gage pressure by means of primary regulator while checking butterfly position indicator. Valve position indicator must move to full CLOSED position at 86 ±4 psig.
Record primary gage pressure when valve position indicator moves to full CLOSED position.

System 1 HP valve psig
System 2 HP valve psig

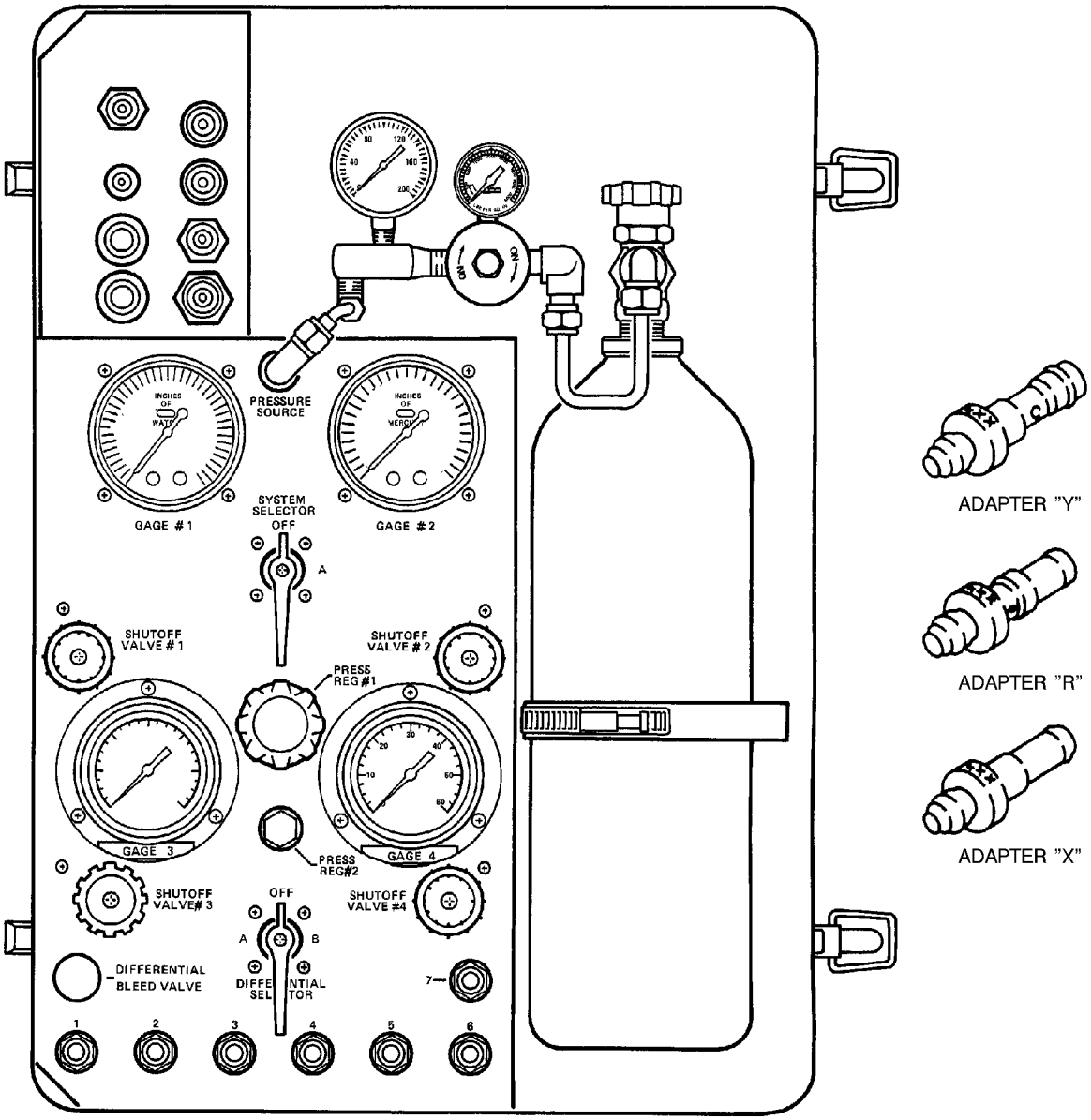
11 Decrease primary gage pressure to zero by means of primary regulator. Valve position indicator should move to full CLOSED position.

12 Check that pneumatic supply pushbutton switch of system being tested is in OFF position.

13 Close tester cylinder shutoff valve.

14 Disconnect tester and place all controls back to OFF position.

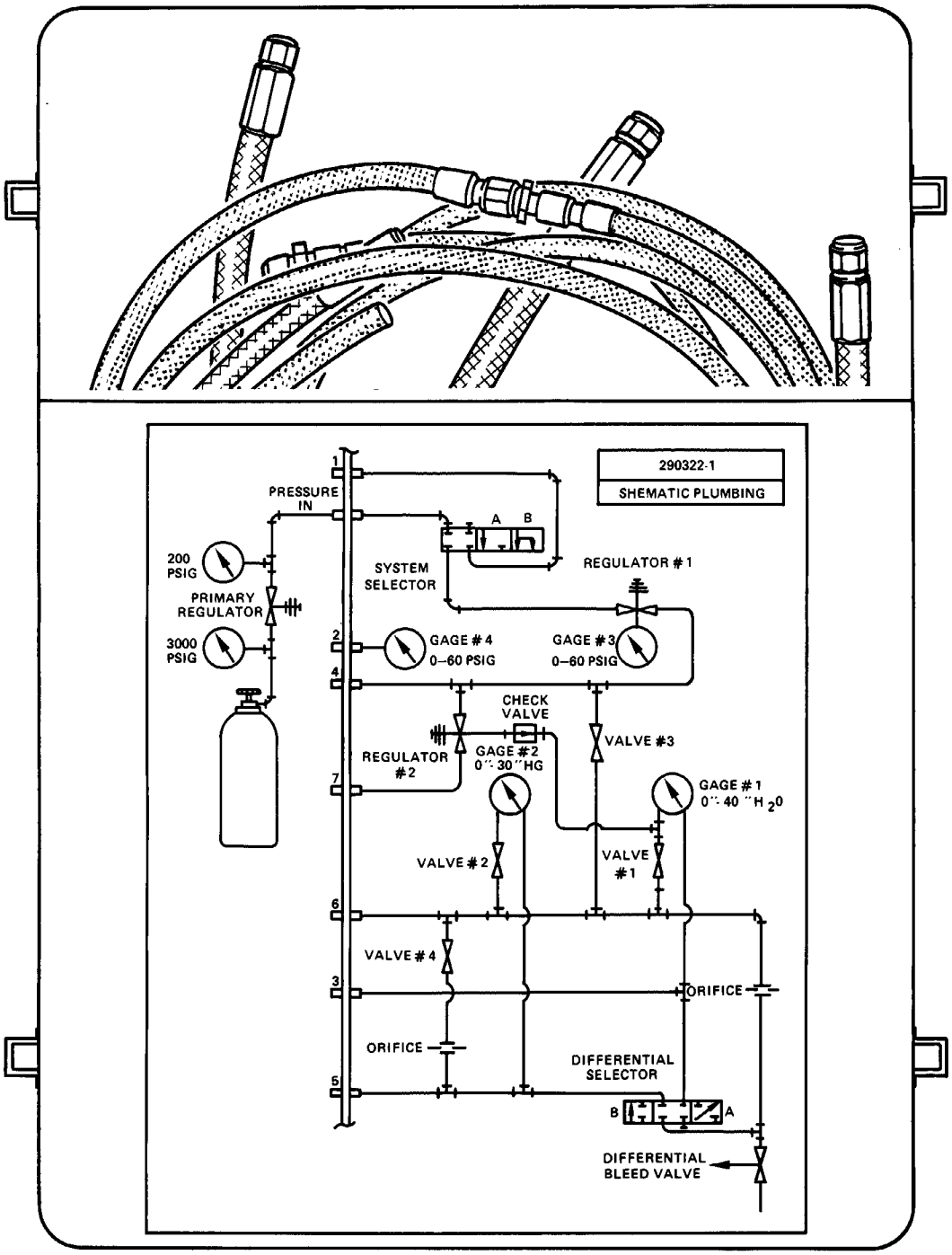
15 Restore aircraft to normal operating condition.
(Ref. Fig. 023)



BM5 36 11 00 0 BSAA 00

Pneumatic Tester P/N 290121-4 (Sheet 1/2)
Figure 021

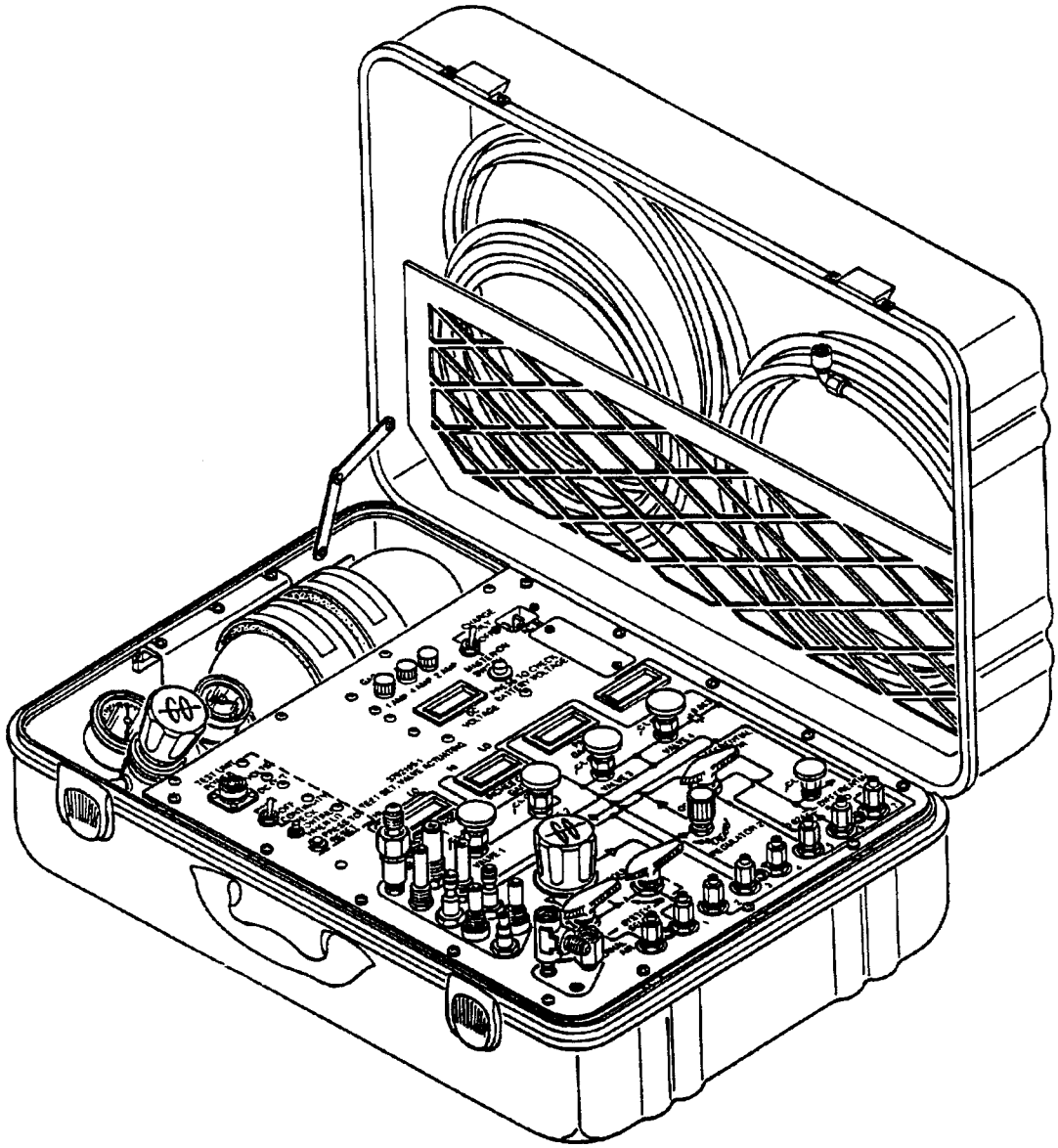
R



BM5 36 11 00 0 BSAB 00

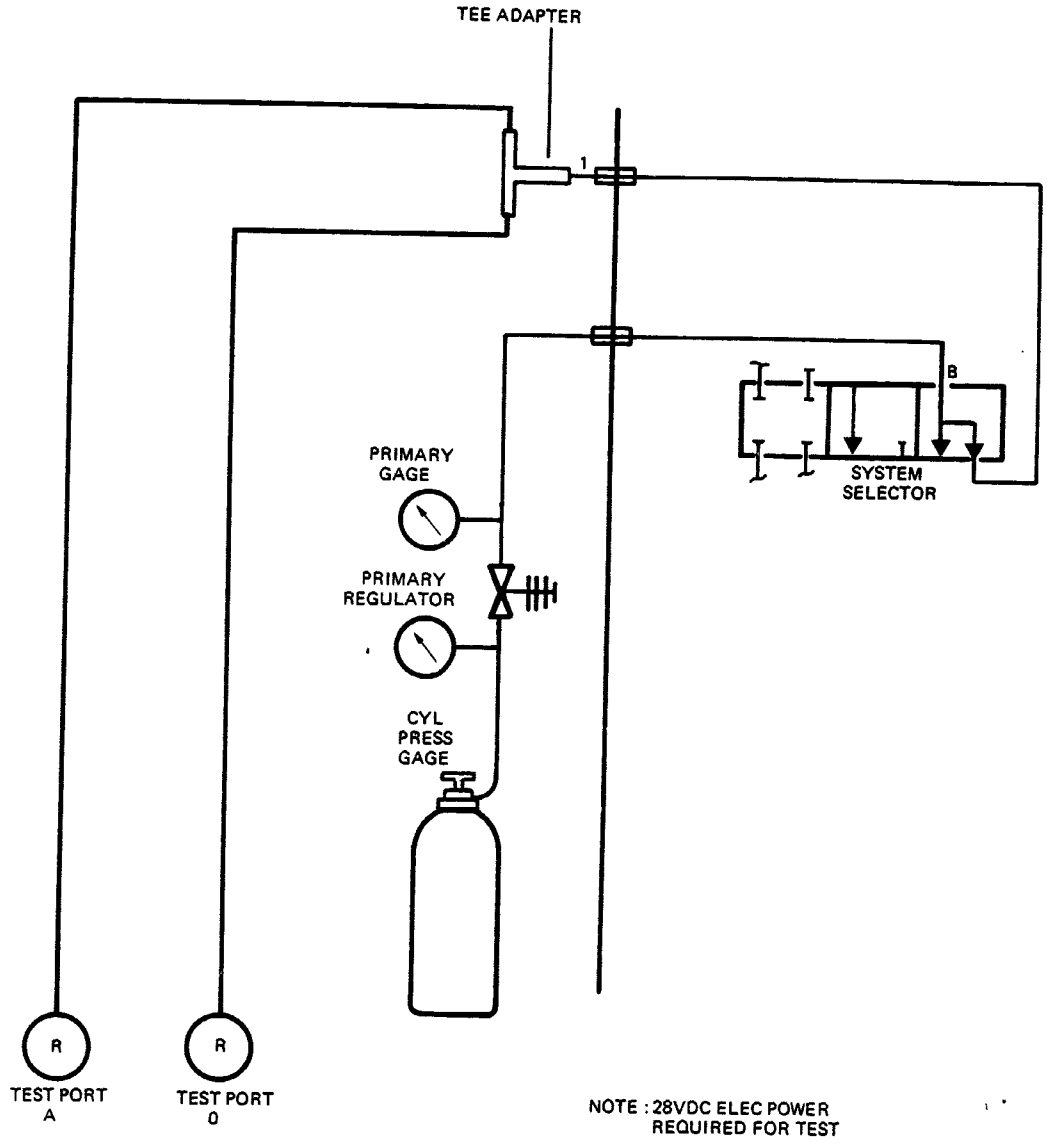
Pneumatic Tester P/N 290121-4 (Sheet 2/2)
Figure 021

R



BM5 36 11 00 0 BSB0 00

R Pneumatic Tester P/N 3792195-1
Figure 022



BM5 36 11 00 0 BTMO

HP Valve In Situ Test - Schematic
Figure 023

(b)Bleed valve inspection/check

Check for correct operation of bleed valve actuation and reverse flow check mechanism.

CAUTION : MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.

1 Check that pneumatic supply pushbutton switch of system being tested is in AUTO position, to de-energize bleed valve solenoid.

2 Fit an X adapter to test ports C and N and an R adapter to test port B.

3 Place all tester controls in OFF position and close all valves.

4 Connect tester : tester fitting No.4 to adapter R in test port B ; tester fitting No.5 to adapter X in test port C ; tester fitting No.6 to adapter X in test port N.

R 5 Open tester cylinder shutoff valve and place SYSTEM SELECTOR in A position.

R 6 Place DIFFERENTIAL SELECTOR in B position.

R NOTE : Make certain that the DIFFERENTIAL BLEED VALVE is closed.

7 Slowly increase primary gage pressure to 60 psig by means of primary regulator.

8 Open shutoff valves No.2 and No.3.

9 Slowly increase gage No.3 pressure to 30 psig, valve position indicator should remain in CLOSED position.

R 10 Slowly open DIFFERENTIAL BLEED VALVE while checking the valve position indicator. Valve position indicator should move to full OPEN position by one inch of mercury (1 Hg) as indicated on gage No.2.
Record gage No.2 reading when valve position indicator moves to full OPEN position.
System 1 bleed valve Hg.
System 2 bleed valve Hg.

R 11 Close DIFFERENTIAL BLEED VALVE, position indicator should move to full CLOSED position.

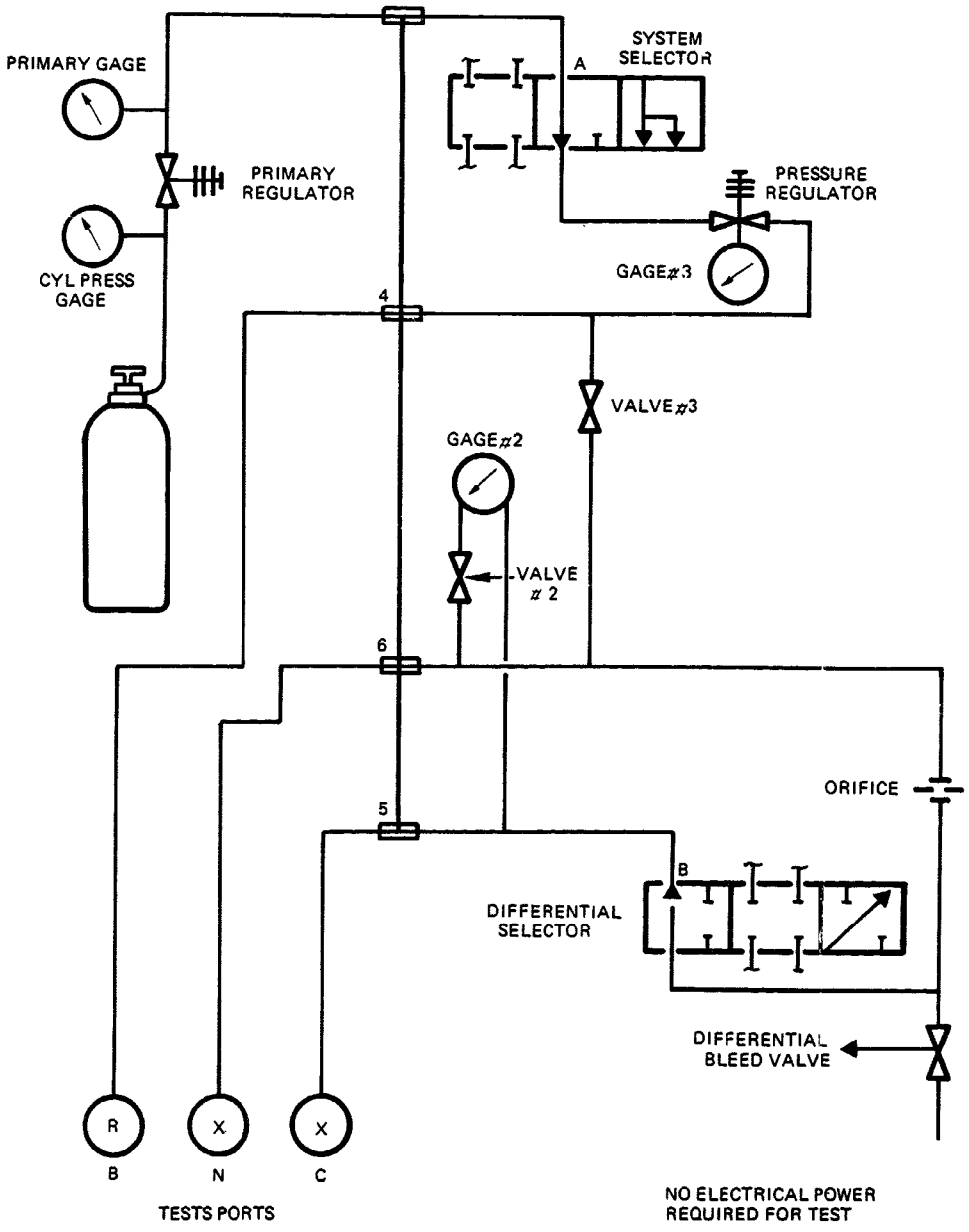
12 Decrease gage No.3 pressure to zero by means of the pressure regulator, and primary gage pressure to zero by means of the primary regulator.

13 Close tester cylinder shutoff valve.

14 Disconnect tester and place all tester controls back to OFF position.

15 Restore aircraft to normal operating condition.

(Ref. Fig. 024)



BM5 36 11 00 0 BVMO

Bleed Valve In Situ Test-Schematic
Figure 024

(c)Fan Air Valve - Inspection/Check

Check for correct operation of the supply pressure relief valve of the fan air valve.

1 Open pneumatic system control circuit breaker located on the main circuit breaker panel for system being tested.
2 Fit adapter X to test port E.
3 Open tester cylinder shutoff valve.
R 4 Place tester **SYSTEM SELECTOR** in **B** position.
5 Slowly increase primary gage pressure while checking valve butterfly position indicator. Position indicator should move to full **OPEN** position at 20 psig.
6 Disconnect vent line from relief valve.
7 Increase tester primary gage pressure until relief valve opens. Relief valve should open at 190 psig, as indicated on the primary gage.

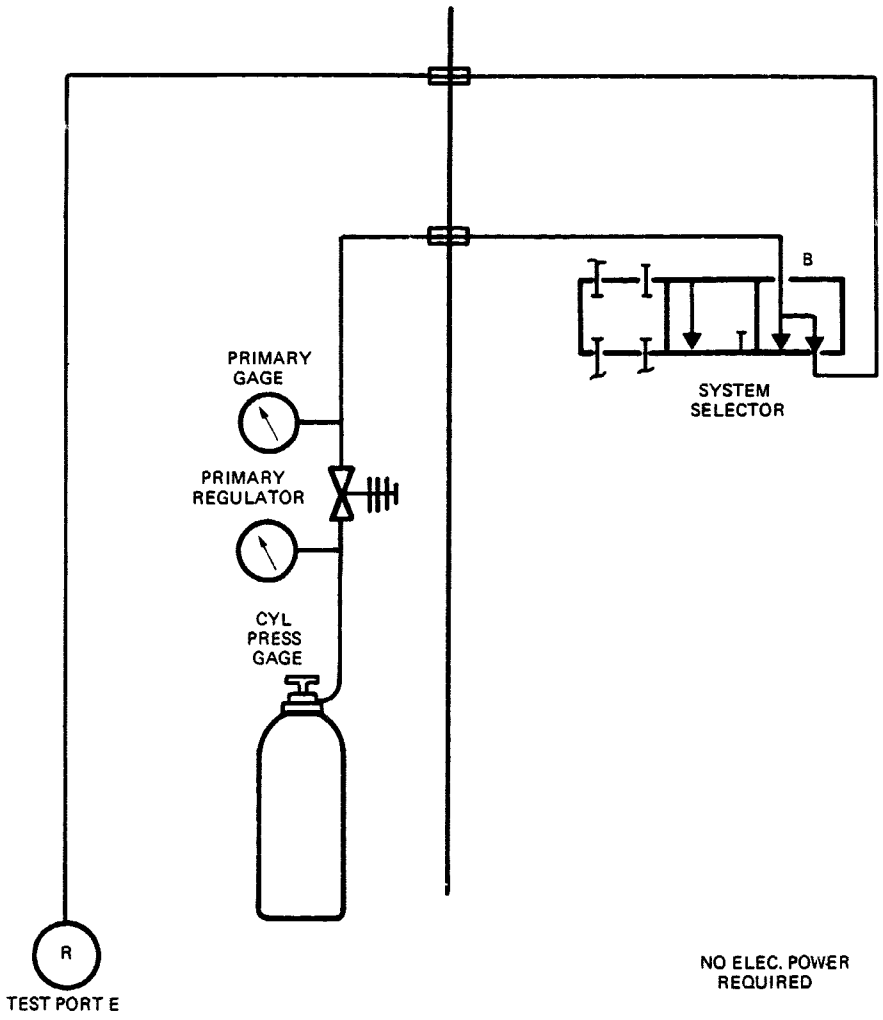
NOTE : Aurally check that air is escaping from valve.

Record primary gage reading when relief valve opens.

System 1 fan air valve _____ psig.
System 2 fan air valve _____ psig.

8 Decrease tester primary gage pressure to zero.
9 Connect vent line to relief valve.
10 Close tester cylinder shutoff valve.
11 Restore aircraft to normal operating condition.

(Ref. Fig. 025)



BM5 36 11 00 0 BXMO

Fan Air Valve In Situ Test-Schematic
Figure 025

(d)Overpressure valve inspection/check (Ref. Fig. 026)

Check for correct operation of overpressure valve.

CAUTION : MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.

1 Place all tester controls in OFF position.

2 Remove plug from test port D.

3 Fit adapter R to test port D.

4 Connect tester : tester No.1 to adapter R in test port D.

R 5 Place SYSTEM SELECTOR in B position.

6 Slowly increase primary regulator gage pressure to 45 psig by means of primary regulator while checking butterfly position indicator. Butterfly should remain open.

7 Slowly increase primary regulator gage pressure until butterfly position indicator moves to full CLOSED position.

NOTE : Butterfly position indicator should begin to move to the CLOSED position at not less than 74 psig and shall be fully CLOSED at not more than 90 psig.

- Record primary gage reading when valve butterfly position indicator starts to close.

  System 1 overpressure valve ____ psig.
  System 2 overpressure valve ____ psig.

- Record primary gage reading when valve butterfly position indicator is in full CLOSED position.

  System 1 overpressure valve ____ psig.
  System 2 overpressure valve ____ psig.

8 Slowly decrease primary gage pressure while checking butterfly position indicator. The indicator should move to full OPEN position at not less than 40 psig.

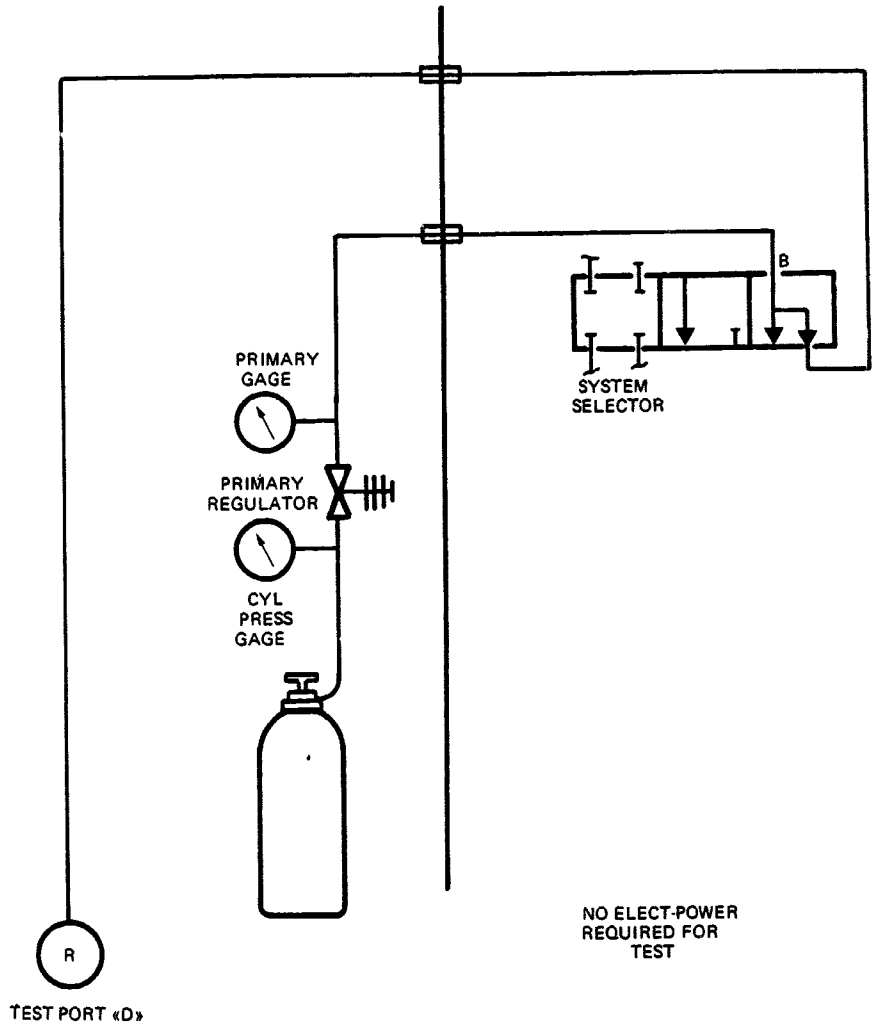
Record primary gage reading when valve butterfly position indicator moves to full OPEN position.

System 1 overpressure valve ____ psig.
System 2 overpressure valve ____ psig.

9 Decrease primary gage pressure to zero.

10 Disconnect tester and place all controls back to OFF position.

11 Restore aircraft to normal operating condition. (Ref. Fig. 026)



BM5 36 11 00 0 BZMO

Overpressure Valve In Situ Test-Schematic
Figure 026

ENGINE BLEED AIR SUPPLY SYSTEM - DESCRIPTION AND OPERATION

1. General

The system is designed to :
- select the compressor stage from which air is bled, depending on the pressure and/or temperature existing at the last stage of the engine HP compressor,
- regulate bleed air pressure in order to avoid excessive pressures,
- regulate bleed air temperature in order to avoid excessive temperatures.

(Ref. Fig. 001)

2. Component Location

(Ref. Fig. 002)

**ON A/C 001-005,

(Ref. Fig. 003)

R **ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

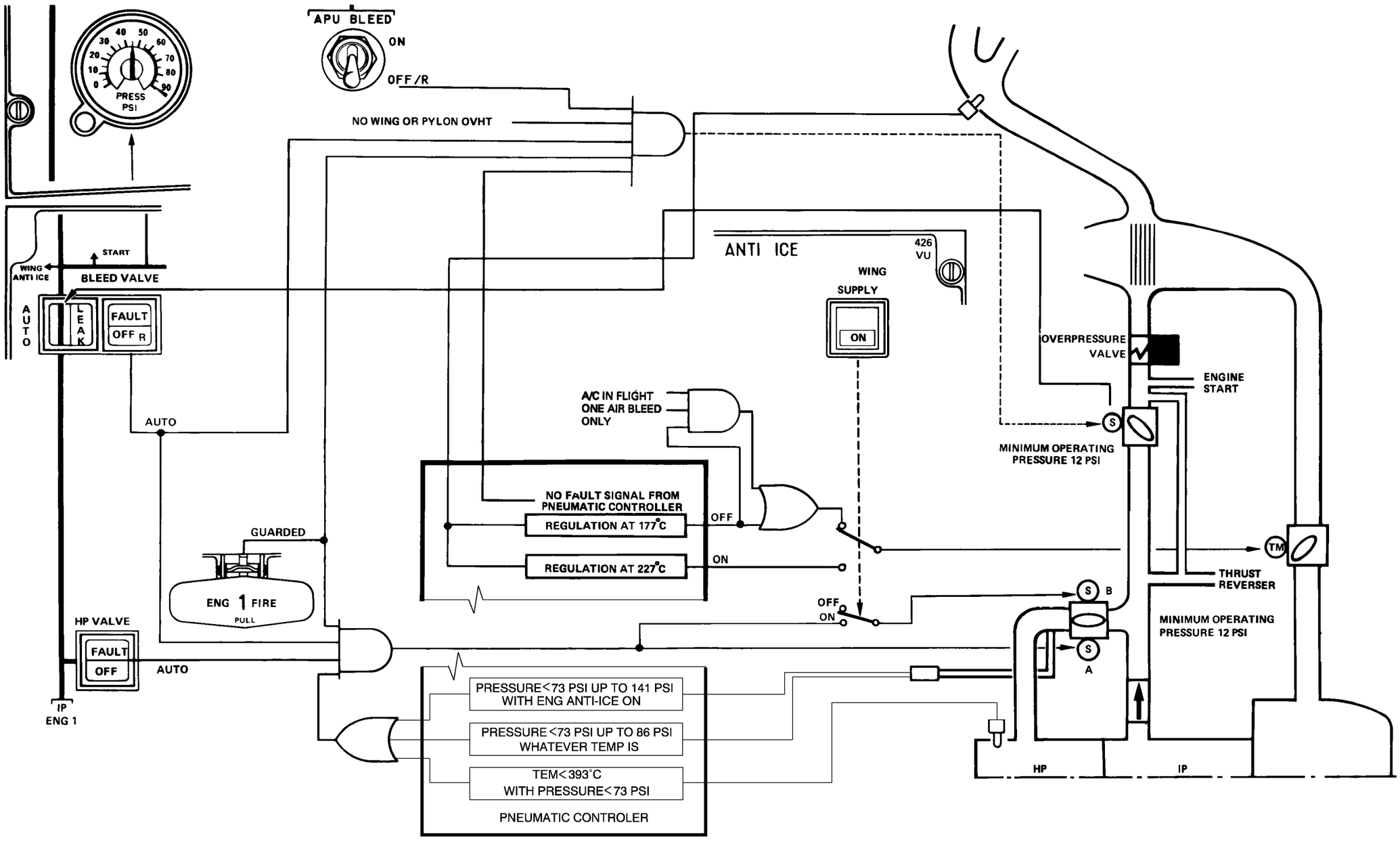
(Ref. Fig. 004)

R **ON A/C 001-100,

(Ref. Fig. 005)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
41HA	CONTROLLER-PNEUMATIC, 1	96VU	122	121BL	36-11-19
42HA	CONTROLLER-PNEUMATIC, 2	91VU	122	121BL	36-11-19
47HA	SENSOR-HIGH STAGE PRESS, 1		415	415AL	36-11-23
48HA	SENSOR-HIGH STAGE PRESS, 2		425	425AL	36-11-23
49HA	SENSOR-REGULATOR PRESS, 1		415	415AL	36-11-22
50HA	SENSOR-REGULATOR PRESS, 2		425	425AL	36-11-22
51HA	VALVE-FAN AIR, 1		451	451AL	36-11-16
52HA	VALVE-FAN AIR, 2		461	461AL	36-11-16
53HA	SENSOR-TEMP CONTROL, 1		471	471AL	36-11-21
54HA	SENSOR-TEMP CONTROL, 2		481	482AR	36-11-21
149HA	P/BSW-AIR BLEED/ ENG1/HP VALVE	436VU	211		36-11-00
150HA	P/BSW-AIR BLEED/ENG2/BLEED VALVE	436VU	211		36-11-00
151HA	P/BSW-AIR BLEED/ENG1/BLEED VALVE	436VU	211		36-11-00
152HA	P/BSW-AIR BLEED/ENG2/HP VALVE	436VU	211		36-11-00
153HA	ANNUNCIATOR-AIR BLEED/ENG1/BLEED VALVE	436VU	211		36-11-00
154HA	ANNUNCIATOR-AIR BLEED/ENG2/BLEED VALVE	436VU	211		36-11-00
DV224	VALVE-BLEED, ENG1		452	452AR	36-11-14
DV225	VALVE-HP, ENG1		452	452AR	36-11-12
A004	CHECK VALVE-IP, ENG1		452	452AR	36-11-13
T603	SENSOR-HIGH STAGE TEMP, ENG1		453	451AL	36-11-18

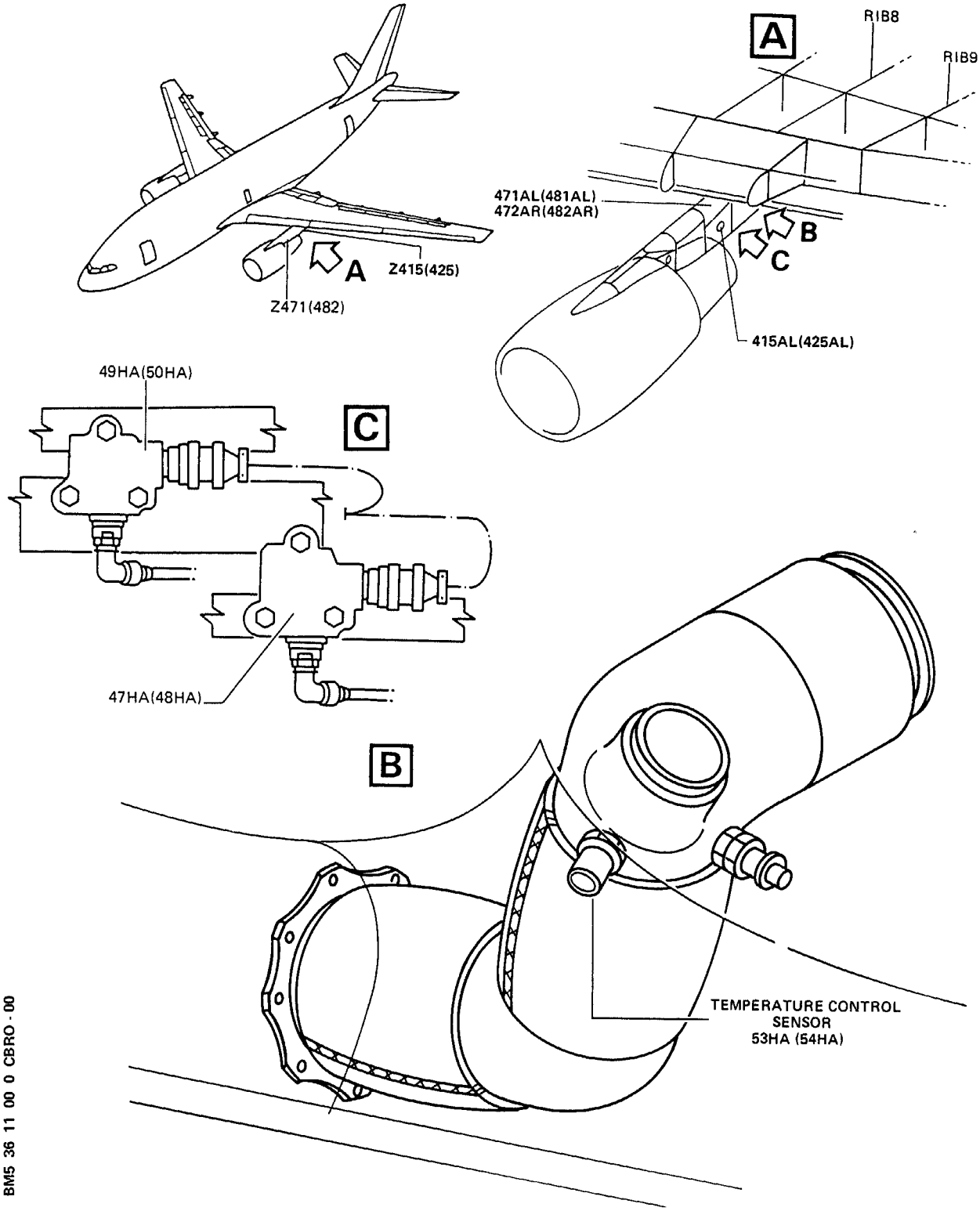
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
DV224	VALVE-BLEED, ENG2		462	462AR	36-11-14
DV225	VALVE-HP, ENG2		462	462AR	36-11-12
B004	CHECK VALVE-IP, ENG2		462	462AR	36-11-13
T603	SENSOR-HIGH STAGE TEMP, ENG2		463	461AL	36-11-18
A007	PRECOOLER-BLEED AIR, 1		413	413BL	36-11-15
A009	VALVE-OVERPRESSURE, ENG1		413	413AL 414AR	36-11-17
B007	PRECOOLER-BLEED AIR, 2		423	423BL	36-11-15
B009	VALVE-OVERPRESSURE, ENG2		423	423AL 424AR	36-11-17



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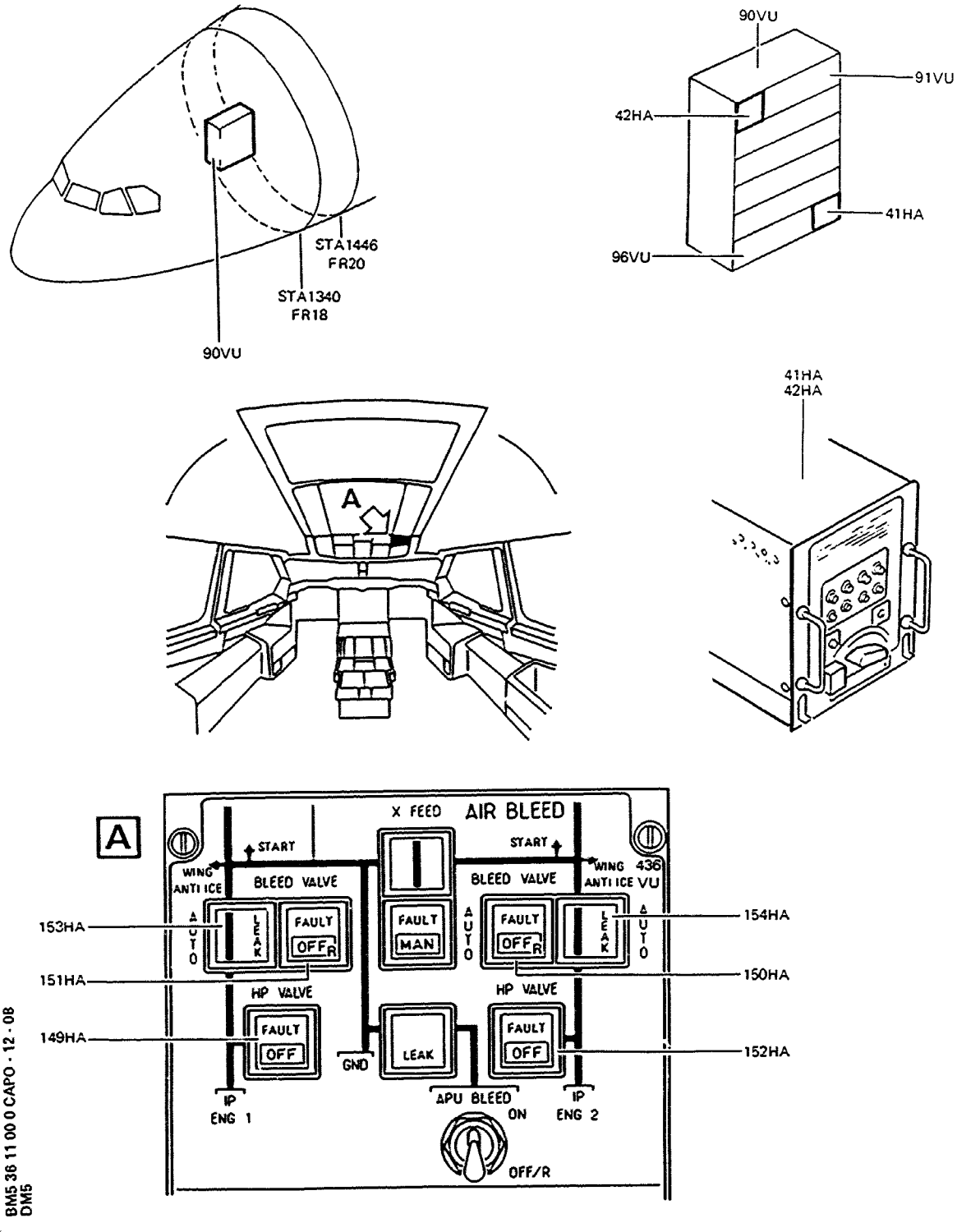
Engine Air Bleed - Schematic
Figure 001

R

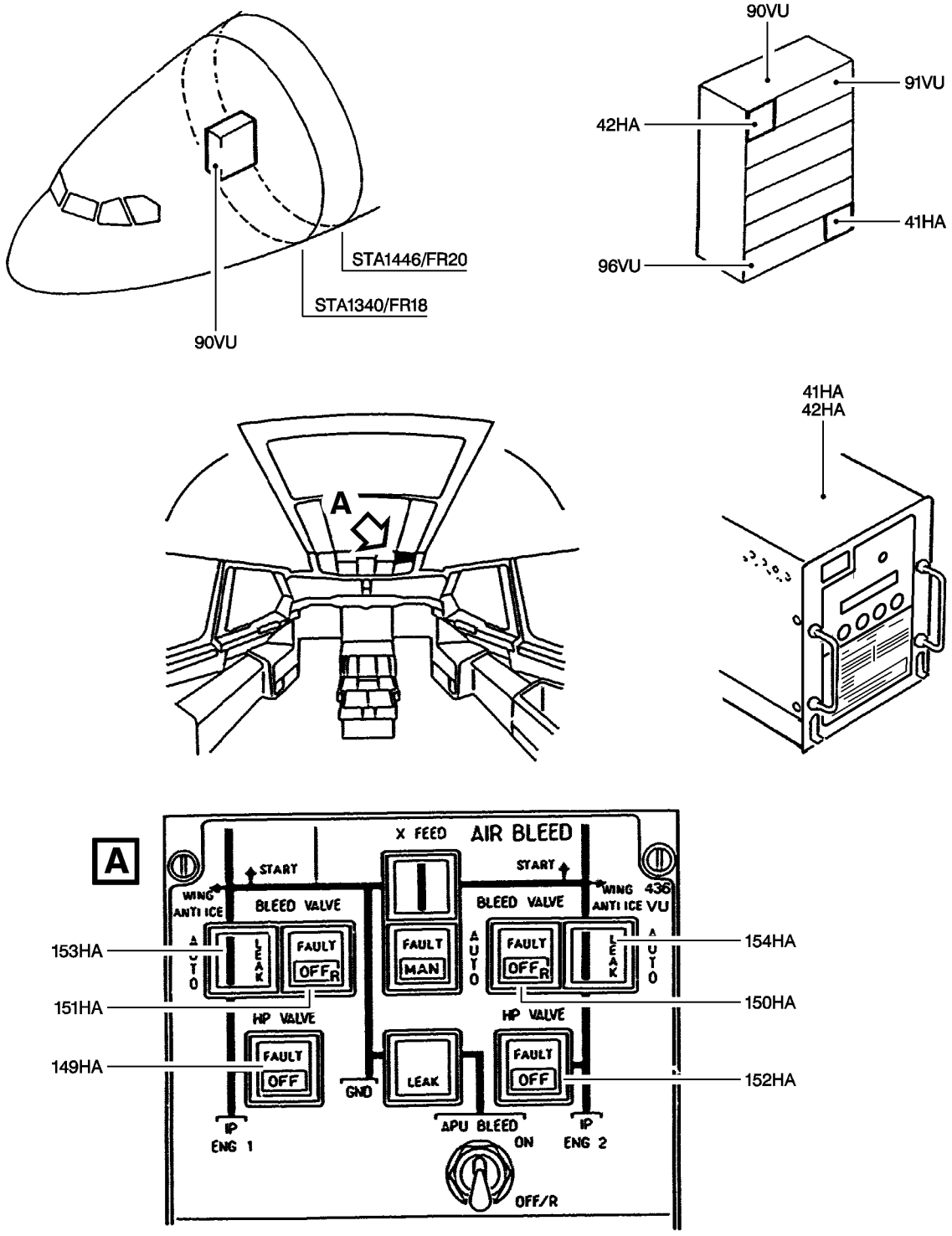


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Sensors - Location
Figure 002

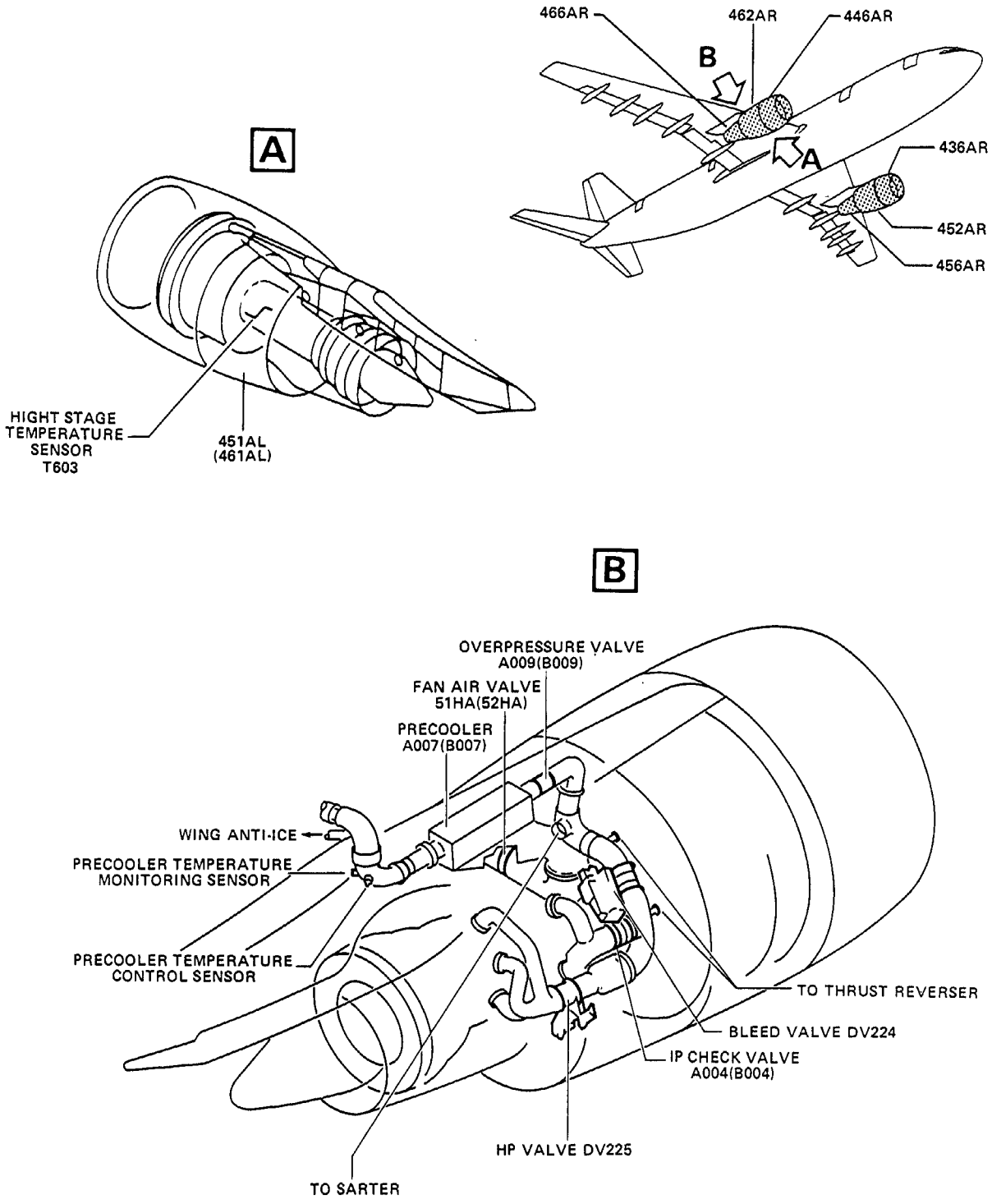


Control and Indicating - Location
Figure 003



BM5 36 11 00 0 CAQ0 00

Control and Indicating - Location
Figure 004



BM5 36 11 00 0 CDPO - 01

Component Location in Nacelle and Pylon
Figure 005

3. Air Bleed Selection

A. Description and Operation

Air is generally bled from an intermediate stage of the engine HP comprssor (IP stage) to minimize engine pressure losses : this is the normal engine air bleed configuration.

- The IP stage is the 8th HP compressor stage. During low engine speeds, when the temperatures and pressures from the IP stage are insufficient, air is automatically bled from the last compressor stage (HP stage), particulary for certain holding points and during descent, with engines at idle.
- The HP stage is the 14th HP compressor stage.

Transfer of air bleed is achieved by means of a pneumatically operated, electrically controlled butterfly valve, designated HP valve.
When the HP valve is closed, air is directly bled from the IP stage through one IP check valve fitted with two flappers.
When the HP valve is open, the HP stage pressure is admitted into the pneumatic ducting and closes the check valve ; ait is therefore bled from the HP stage only. The HP-IP transfer is selected to meet the conditions upstream of the valve (pressures and temperatures at the HP compressor stage).
The valve includes two solenoids (A and B) which control valve opening or closing for two different pressure values, depending on whether teh wing ice protection system is operational or not.
In normal automatic operation, the valve is :

(1)Pneumatically operated :
- closed if upstream pressure is greater than transfer pressure (PT) ;
- open if upstream pressure is lower than transfer pressure.

With wing ice protection system off :
SOLENOID A only is energized, transfer pressure is 86 ± 4 psig.
With wing ice protection system on :
solenoids A and B are energized, transfer pressure is 141 ± 4.5 psig.

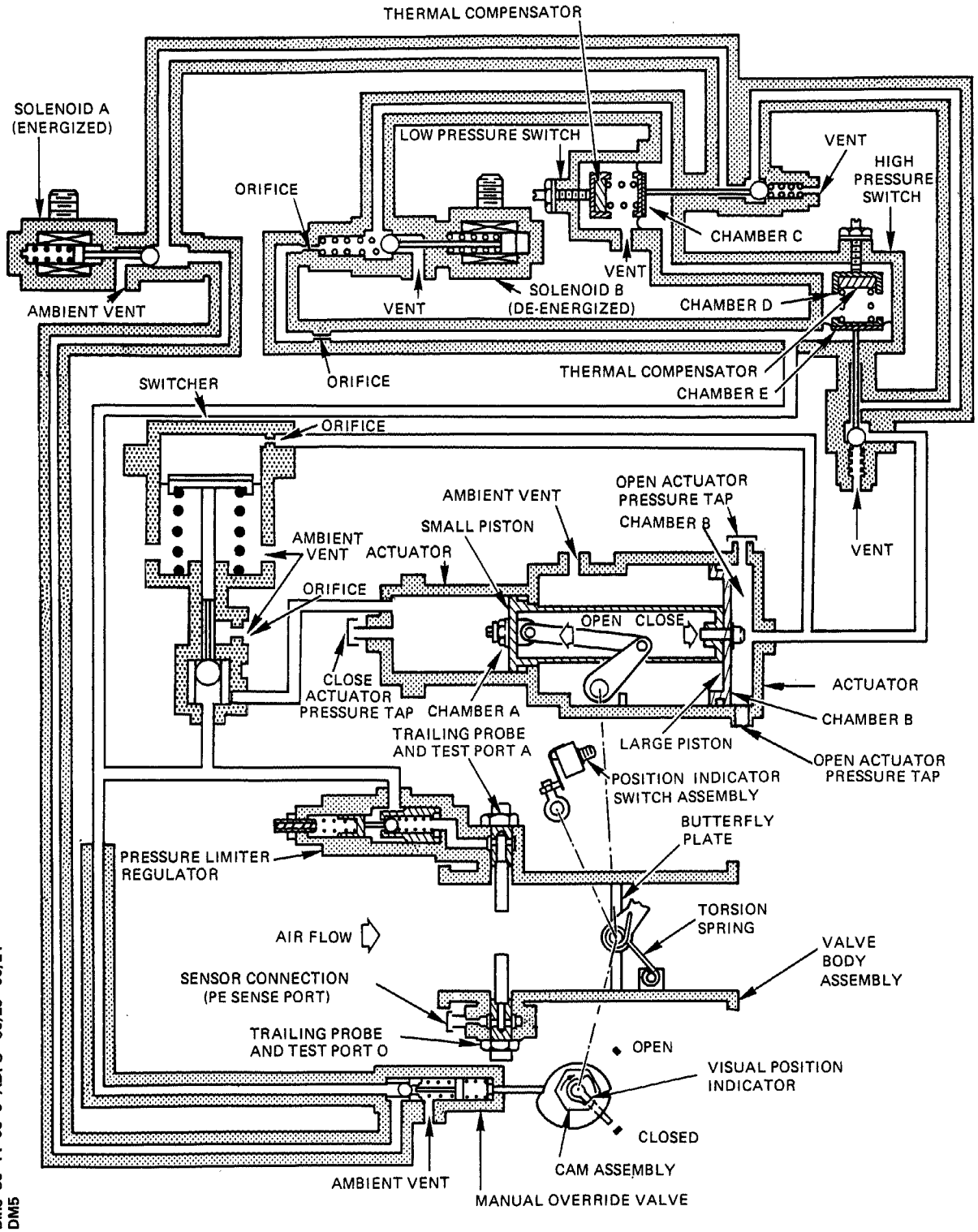
(2)Electrically controlled closed by de-energization of solenoid A, as soon as upstream temperature exceeds transfer temperature (TT). The electrical signal generated by a sensor located on the engine is trnasmitted by the controller. Transfer temperature (TT) = 393° ± 3 °C if HP stage air pressure (PE) is higher than 73 psig.

B. HP Valve Description

(Ref. Fig. 006)
(Ref. Fig. 007)
As most of the electro-pneumatically operated valves, the HP valve is spring-loaded closed in the absence of pressure ; it opens at a minimum upstream pressure (12.5 psig). The valve can be manually locked in closed position (ground check) and is provided with an in situ test port.
The shutoff valve is of the butterfly-type, 5 in.dia., pneumatically operated and controlled by two solenoids (A and B).
The valve is normally spring-loaded closed in the absence of power supply or upstream pressure.

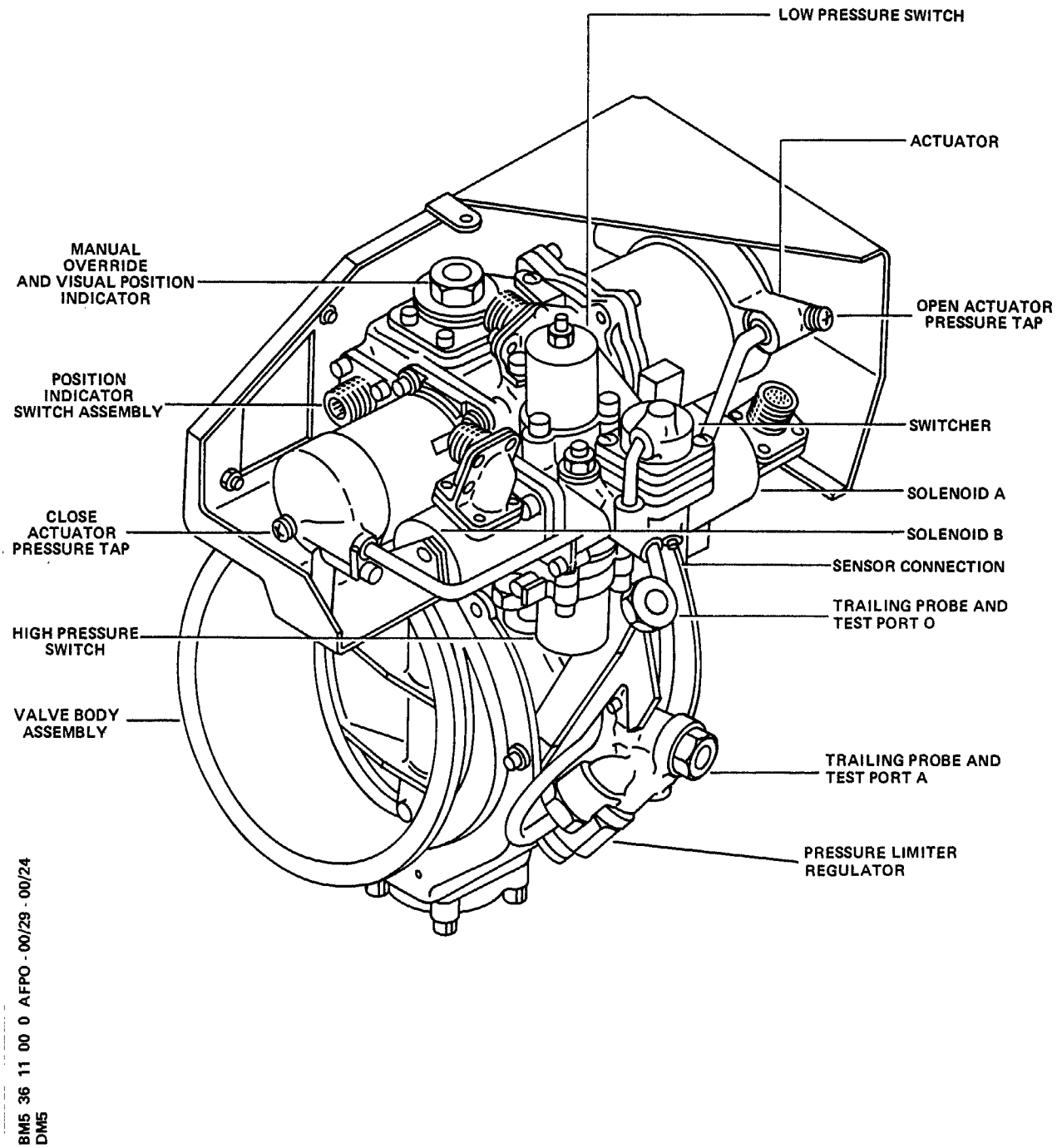
- Opening of the valve

When solenoid A is energized, upstream air is admitted into chamber A via a pressure limiter then into chamber B via the low and high pressure



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DM5

HP Valve - Schematic
Figure 006



HP Valve - Perspective View
Figure 007

switches. Since chamber B piston is larger than chamber A piston, the resulting force exerted from B to A overcomes the force of the torsion spring at a preset pressure value, thus causing the valve to open and maintaining it open.
This preset value corresponds to an upstream pressure of 10 psig.

. Closing of the valve :
When solenoid A is de-energized, chamber B is vented to ambient while upstream air is still admitted directly into chamber A. The pressure in chamber B associated with the load exerted by the butterfly spring closes the valve.

. Low lever transfer :
When solenoid B is not energized, pressure in chamber D is identical to that of chamber E, and the high pressure switch remains closed under the load exerted by chamber D spring.
When pressure in chamber C reaches the preset value, the low pressure switch vents chamber B to ambient ; therefore, the valve closes under the load exerted by the spring and the pressure in chamber A.
When pressure decreases upstream of the valve, the load exerted by the low level switch spring predominates ; therefore chamber B is no longer vented but pressurized again and the valve opens.

. High level transfer :
When solenoid B is energized, chambers C and D are vented to ambient.
When pressure in chamber E reaches the preset value, the high level switch opens, thus venting chamber B to ambient and causing the valve to close.
When pressure decreases upstream of the valve and below the preset value, the load exerted by the high level switch spring predominates ; thus chamber B is no longer vented and the valve opens again.
Thermal compensators installed in the low and high level switches are provided to avoid changes in preset values due to temperature variations.

. Emergency control, safety devices and indicating :
A manual override provided with a hex cam lifts the ball from its seat by means of a rod, thus venting to ambient the whole control system and resulting in complete closure of the valve. In addition, a wheel assembly directly connected to the valve butterfly shaft enables mechanical opening or closing of the valve on the ground.
A pressure limiter closes the control system when upstream pressures are excessive, to avoid damage to the pneumatic actuator.
The valve is fitted with a limit microswitch which cuts off the indicating circuit, 7° from fully closed position. A butterfly visual position indicator is incorporated in the manual override.
The HP valve is fitted with two test ports provided to perform the in situ test, and with one test port provided for the high stage pressure sensor.

C. HP Valve - Controls and Indicating

(1)HP VALVE pushbutton switch pressed (in)

. Indicating : OFF and FAULT legends off.
This configuration corresponds to valve normal automatic operation controlled by the pneumatic controller.

R (2)Illumination warning light :

R FAULT amber warning legend on with ECAM system activated after a
R 60 second time delay.
. MASTER CAUTION lights comes on on CAPT and F/O main instrument panels 3VU and 5VU.
. Single chime.
. On the left ECAM display unit : display of the warning and its associated actions.
. On the right ECAM display unit : display of the AIR BLEED page.
The warning signal is generated by the pneumatic controller in all cases and indicates failure of the HP valve or its automatic control :
- failure of the sensor measuring HP air temperature
- failures of temperature regulation of HP bleed air (TE) :
. TE > HP maximum temperature (414°C), valve opening command (solenoid A energized) and PE > 73 psig
. TE < HP minimum temperature and valve closing command (solenoid A non-energized) (minimum HP temperature = 378°C)

**ON A/C 001-005,

(Ref. Fig. 008)

**ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

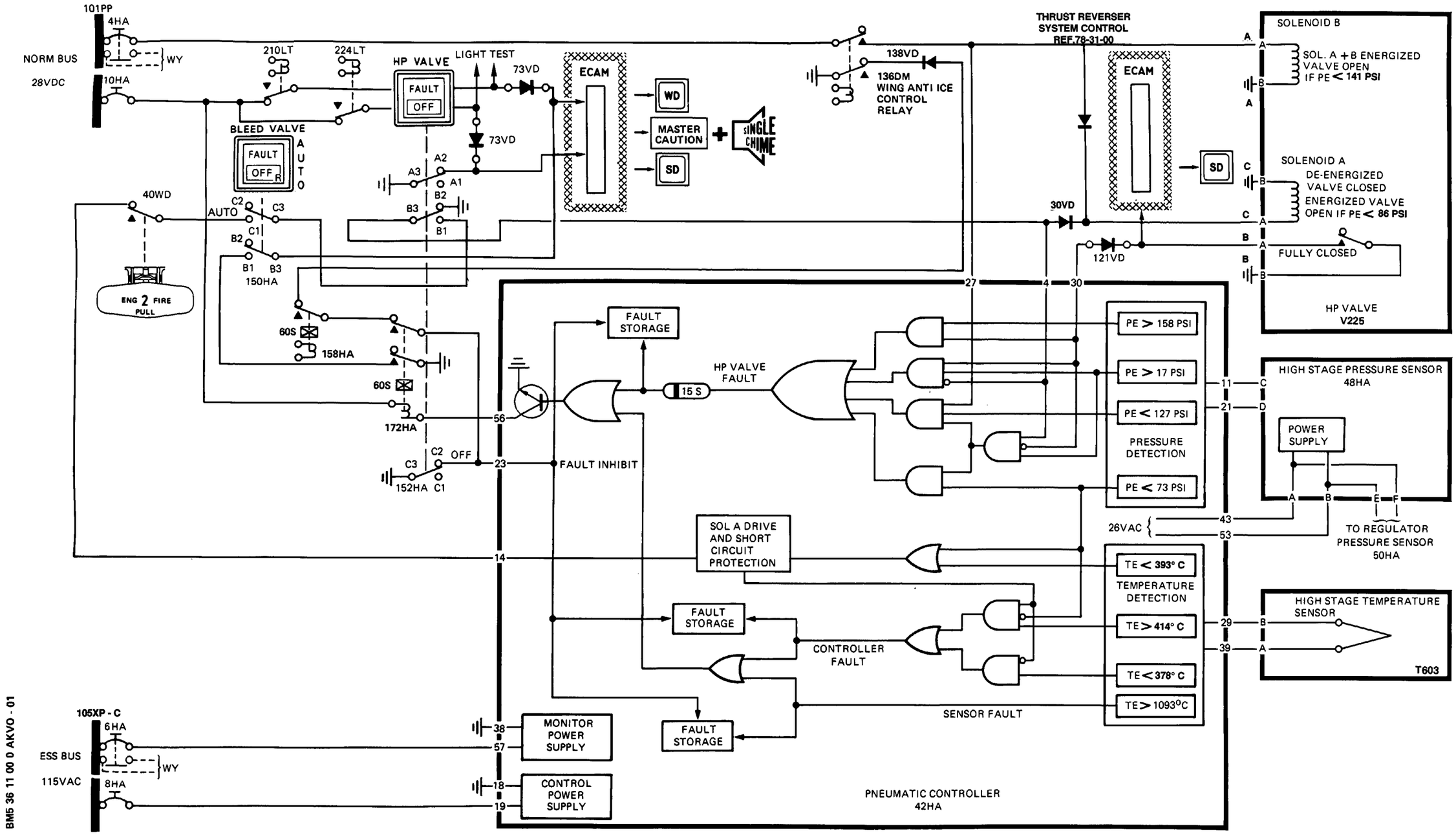
(Ref. Fig. 009)

**ON A/C 001-100,

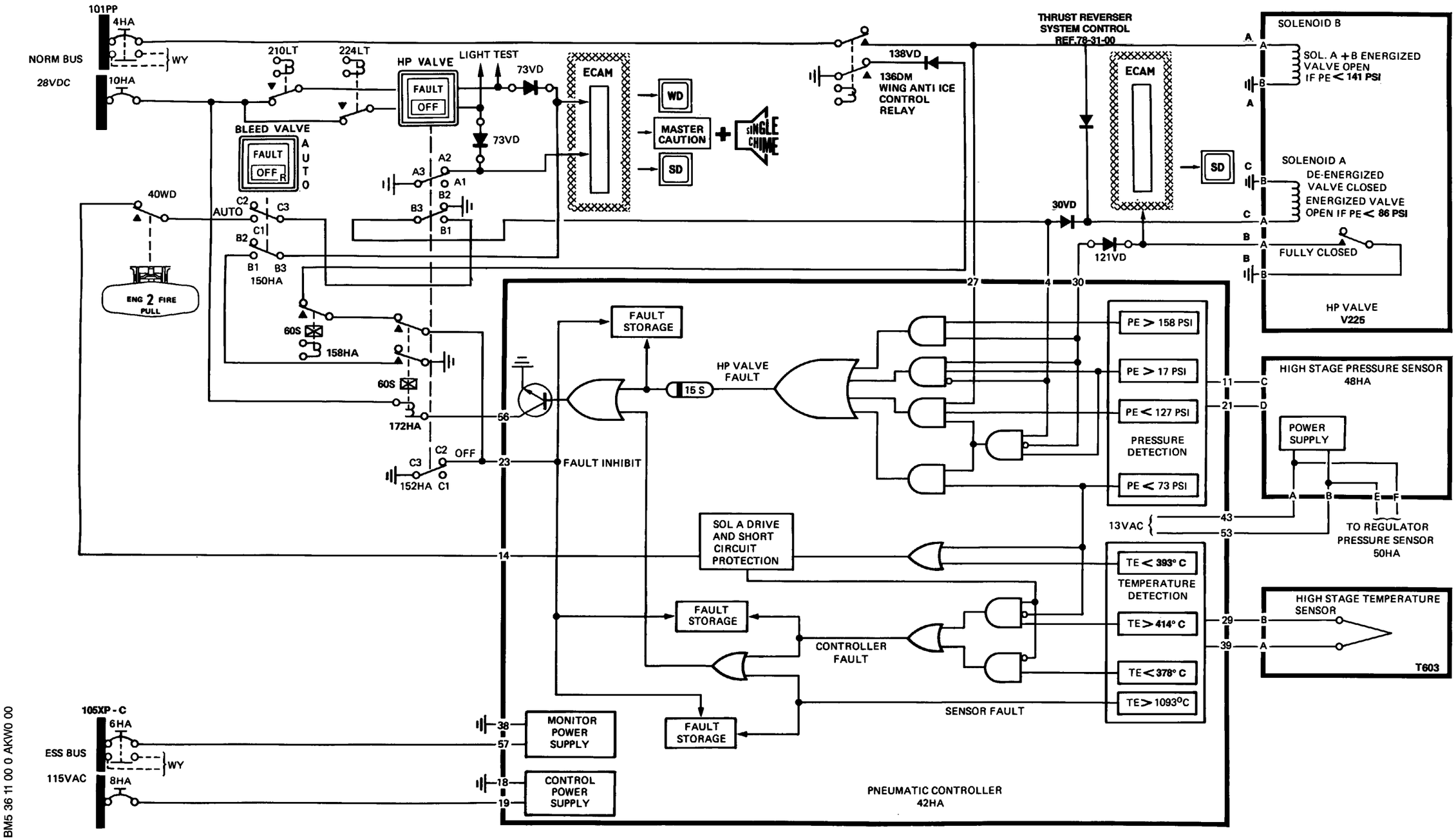
- failure of valve
. valve closing command (solenoid A non-energized), valve not closed and PE > 17 psig
. HP stage pressure (PE) > 158 psig and valve not closed ;
. 17 psig < PE < 73 psig and valve closed (solenoid A only energized : ice protection system off) ;
. 17 psig < PE < 127 psig and valve closed (solenoids A and B energized : ice protection system on).
Action : Close the HP valve by pressing the HP VALVE pushbutton switch (OFF).
R NOTE : - De-energization of solenoid A automatically controls valve
R closing when :
R . The associated BLEED VALVE pushbutton switch is released
R (out) (OFF/R)
R . The associated ENG FIRE handle is actuated.
R - HP valve opening is made possible only if the associated BLEED
R VALVE pushbutton switch is pressed (in) (AUTO).
(3)HP VALVE pushbutton switch released (out)

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Printed in France



HP Valve - Electrical Schematic
Figure 008



BM5 36 11 00 0 AKW0 00

HP Valve - Electrical Schematic
Figure 009

. Indicating : OFF legend on (white), FAULT legend off.
This configuration corresponds to valve closing controlled by de-energization of solenoid A.

R (4)Illumination warning light :
R FAULT legend on (amber) with ECAM system activated : MASTER CAUTION
R lights comes on on CAPT and F/O main instrument panels 3VU and 5VU with
R single chime.
This indicates that the HP valve has remained open and therefore the associated bleed valve should be closed by releasing the BLEED VALVE pushbutton switch (OFF/R) : AIR warning light is inhibited and FAULT legend goes off.
NOTE : After engine shut down it is possible that ECAM (AIR BLEED page display) indicates one or both HP valve (s) OPEN, although they are springloaded closed. This complaint can be caused by internal friction in the HP valve (s) that can result in not actuating the close limit switch. This is not an abnormal situation.
When there are no complaints during normal operation it is not necessary to replace the HP valve (s).

4. Pressure Regulation and Limitation

A. Description and Operation

Downstream of the junction of the IP and HP ducting, air is admitted into the duct by a pneumatically operated, electrically controlled butterfly valve which acts as a shutoff and pressure regulator valve. This valve is designated bleed valve.

It includes a single solenoid which closes the valve when energized and enables pressure regulation when de-energized.

When upstream pressure is sufficient, downstream pressure is regulated at 46 ±2 psig and the pneumatic time-delay prevents abrupt closing of valve and resulting overpressure.

The bleed valve automatically closes in the following cases :

. overheat at the precooler outlet,
. ambient overheat in pylon/fuselage/wing ducts surrounding area,
. failure of pressure regulation,
. failure of temperature regulation at the precooler outlet,
. actuation of ENG FIRE handle,
. APU bleed valve open.

In the absence of air pressure, the valve is spring-loaded closed independently from electrical power supply ; the valve starts to open for a minimum upstream pressure (12 psig) ; it incorporates a reverse flow check mechanism and can be manually locked closed. The valve is provided with an in situ test port.

- An overpressure valve installed at the pylon duct inlet protects the system against overpressure.

B. Bleed Valve Description

- Function

The valve admits or cuts off engine bleed air supply and regulates maximum pressure downstream at a differential preset value, greater than that of ambient pressure. In addition, the valve incorporates a reverse flow check mechanism.

- Operation

The valve is of the butterfly type, 6 in. dia. Opening of valve and regulation of downstream pressure are achieved pneumatically ; closing of valve is controlled by a solenoid.

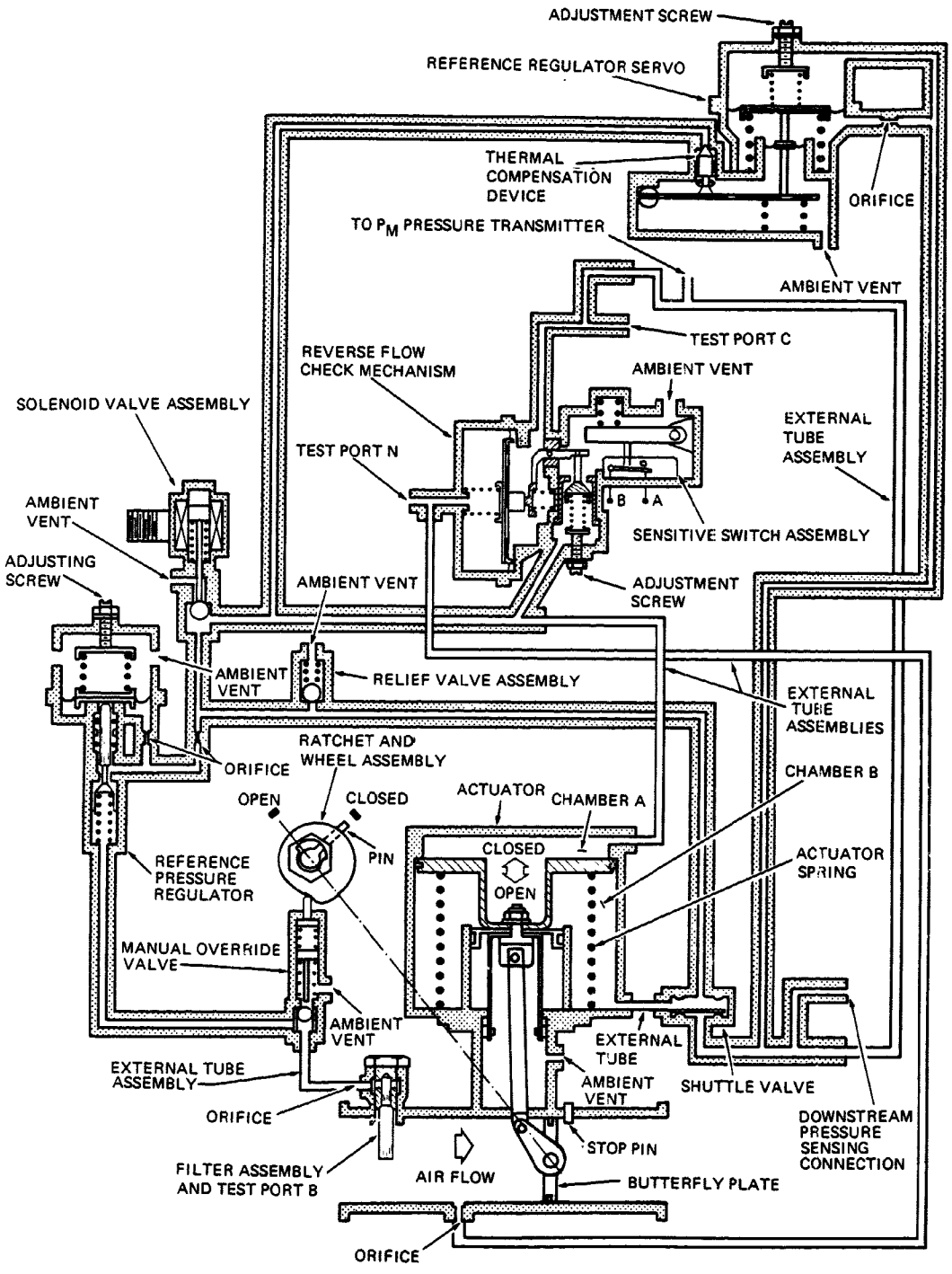
(Ref. Fig. 010)

- Opening and regulation

When the solenoid is not energized, the ball valve blanks off the vent orifice, upstream air is thus ported through a filter into a reference pressure regulator which provides a constant reference pressure : pressure simultaneously enters chamber A and B through a shuttle valve.

When upstream pressure reaches the value determined by the load of the spring and the difference in areas to which pressure is applied in chambers A and B, the butterfly fully opens.

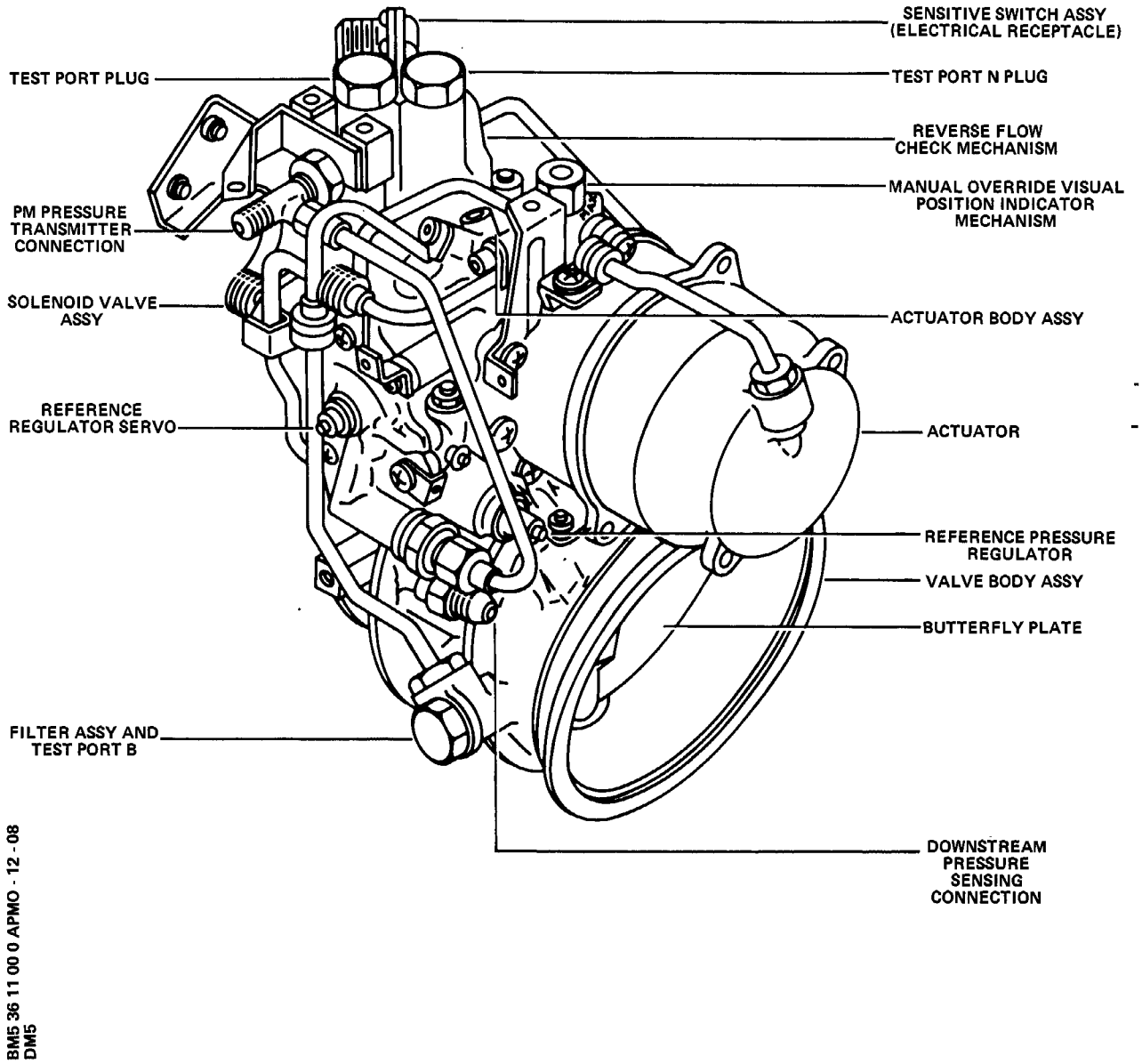
Downstream pressure is then admitted into the regulator servo and the shuttle valve ; when upstream pressure reaches then exceeds the regulated downstream pressure required, the regulator servo when venting chamber A by means of a thermal compensator device, provides the reference pressure required to balance the force exerted in chamber B by downstream pressure.



BM5 36 11 00 0 ALMO

Bleed Valve - Schematic
Figure 010

The regulator servo is sensitive to small variations in downstream pressure and regulates pressure in chamber A according to upstream pressure variations and flow requirements.
The regulator servo incorporates a diaphragm assembly providing rapid response of the valve to upstream pressure transients.
- Closing
When the solenoid is energized, the ball of the solenoid displaces and closes off reference pressure supply to chamber A which is immediately vented to ambient.
The load exerted simultaneously by the spring and the pressure in chamber B closes the valve ; the valve is held closed as long as the solenoid is energized.
- Reverse flow check function
The reverse flow check mechanism compares upstream pressure to downstream pressure. When the difference between these pressures reaches a preset value, the reverse flow check mechanism poppet valve is activated to bleed off chamber A pressure to ambient, allowing the actuator spring and pressure supply through the shuttle valve to position and maintain the butterfly closed.
Closing of the valve is achieved when the difference between downstream pressure and upstream pressure is greater than a value ranging between 0.01 and 0.5 psid (0.7/35 mb).
- Emergency control, safety devices and indicating
The valve includes a manual override provided with a hex cam which lifts a ball from its seat by means of a rod ; this causes venting of upstream pressure and consequently, full closing of the valve.
A wheel assembly directly connected to the valve butterfly shaft enables mechanical opening or closing of the valve on the ground.
A pressure relief valve protects the pneumatic actuator in the event of failure of the reference pressure regulator.
A pressure switch opens the valve indicating circuit as soon as upstream pressure exceeds downstream pressure by a preset value.
(Ref. Fig. 011)



Bleed Valve - Perspective View
Figure 011

C. Bleed Valve - Controls and Indicating
(Ref. Fig. 012)

(1)**BLEED VALVE** pushbutton switch pressed (in)

Indicating : **OFF/R** legend off, **FAULT** legend off and **LEAK** legend of **BLEED VALVE** annunciator off.

This configuration corresponds to valve normal automatic operation which depends on the bleed air supply source :

From Engines	From APU
APU BLEED switch in **OFF/R** position.	**APU BLEED** switch in **ON** position.
The flowbar of **APU BLEED** annunciator is **OFF**.	The flowbar of **APU BLEED** annunciator is **ON**.
The engine bleed valve is open (solenoid non energized).	The engine bleed valve is closed (solenoid energized).

R (2)Illumination warning light :

R **FAULT** amber warning legend on with **ECAM** system activated.

. **MASTER CAUTION** lights come on on **CAPT** and **F/O** main instrument panels **3VU** and **5VU**.

. Single chime.

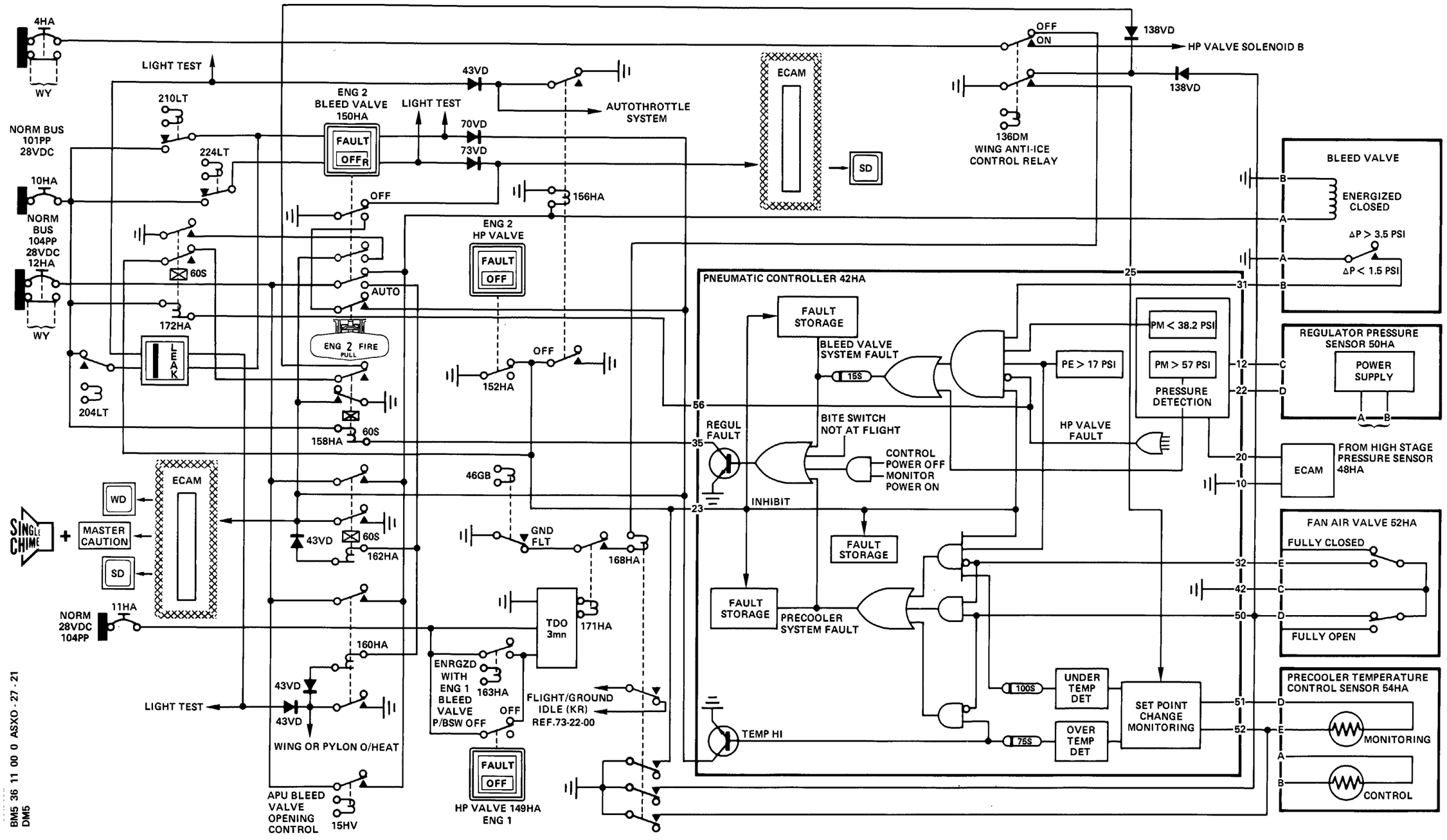
. On the left **ECAM** display unit : display of the warning and its associated actions.

. On the right **ECAM** display unit : display of the **AIR BLEED** page.

- Overheat at the precooler outlet :
  . 207°C with wing ice protection system off.
  . 255°C with wing ice protection system off and in flight with one air bleed inoperative.
  . 255°C with wing ice protection system on.
- failures of pressure regulation sensed by the pneumatic controller and late illumination of the legend after a 60 second delay :
  * **PR** pressure < 38 psig and differential pressure, upstream less downstream (internal Δp) > 3.5 psig.
  * **PR** pressure > 57 psig.
- failures of temperature regulation sensed by the pneumatic controller and late illumination of the legend after a 60 second delay :
  * insufficient temperature at the precooler outlet (TR) with the fan air valve not fully closed
    i.e. : TR < 153°C with wing ice protection system off
    TR < 200°C with wing ice protection system off and in flight with one air bleed inoperative.
    TR < 200°C with wing ice protection on.
  * excessive temperature with the fan air valve not fully open
    i.e. : TR > 207°C with ice protection system off,
    TR > 255°C with ice protection system off and in flight with one air bleed inoperative.
    TR > 255°C with ice protection system on.
  * pneumatic controller **BITE TEST** selector switch not in **FLIGHT** position
  * failure of fan air valve switches (fully open and fully closed)
  * pneumatic controller monitoring power **ON** and control power **OFF**.

. Results : Closing of the bleed valve.

. Actions :



BM5 36 11 00 0 ASXO - 27 - 21
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Bleed Valve - Electrical Schematic
Figure 012

- to confirm bleed valve closing by pressing **BLEED VALVE** pushbutton switch **(OFF/R)** (this also closes the **HP** valve).
- to use crossfeed, if necessary.

FAULT legend goes off :

. when the overheat condition has disappeared

. by inhibition after closing of the above mentioned valves (except in case of overheat).

LEAK legend on (amber) with **ECAM** system activated : **MASTER CAUTION** lights flash on **CAPT** and **F/O** main instrument panels **3VU** and **5VU** accompanied by single chime.

Configuration corresponding to ambient overheat in the surrounding area of air ducts located in pylon or wing.

This warning closes the corresponding bleed valve.

(3) Inhibition of failures and warnings

To prevent triggering of spurious warnings at air bleed system closing **(BLEED VALVE** pushbutton switch released out - **OFF/R** legend on-) or at **HP** air bleed system closing **(HP VALVE** pushbutton switch released out - **OFF** legend on-), bleed valve **ΔP** switch, fan air valve opening/closing switch and air bleed under temperature detection failures of the operating air bleed system are inhibited.

When the aircraft is in flight configuration, with wing ice protection off and one air bleed system inoperating, the bleed valve **ΔP** switch, the fan air valve opening/closing switch and the undertemperature detection failures of the operating air bleed system are inhibited by closing air bleed **(BLEED VALVE** pushbutton switch released (out) - **OFF/R)** or **HP** air bleed **(HP VALVE** pushbutton switch released (out) - **OFF)** of the other system (system inoperating).

In flight, when the previously closed system is opened, the inhibition remains effective during **3** minutes in order to avoid triggering of a false warning.

(4) Control of engine minimum idle increase

In order to obtain air pressure sufficient to supply the air conditioning system when the aircraft is in descent and one air bleed system operating, the engine minimum idle is automatically transferred to flight idle (Ref. 73-20-00, P. Block 1).

(5) **BLEED VALVE** pushbutton switch released (out)

. Indicating : **OFF/R** legend on (white), **FAULT** legend off. This configuration corresponds to valve closing control (solenoid energized). This action also controls associated **HP** valve closing.

. Warning : **FAULT** legend on (amber) with **ECAM** system activated. **(PR > 57** psig) and late illumination of legend with a **60** second delay.

. Action : To confirm associated **HP** valve closing control by pressing **HP VALVE** pushbutton switch **(OFF)**.

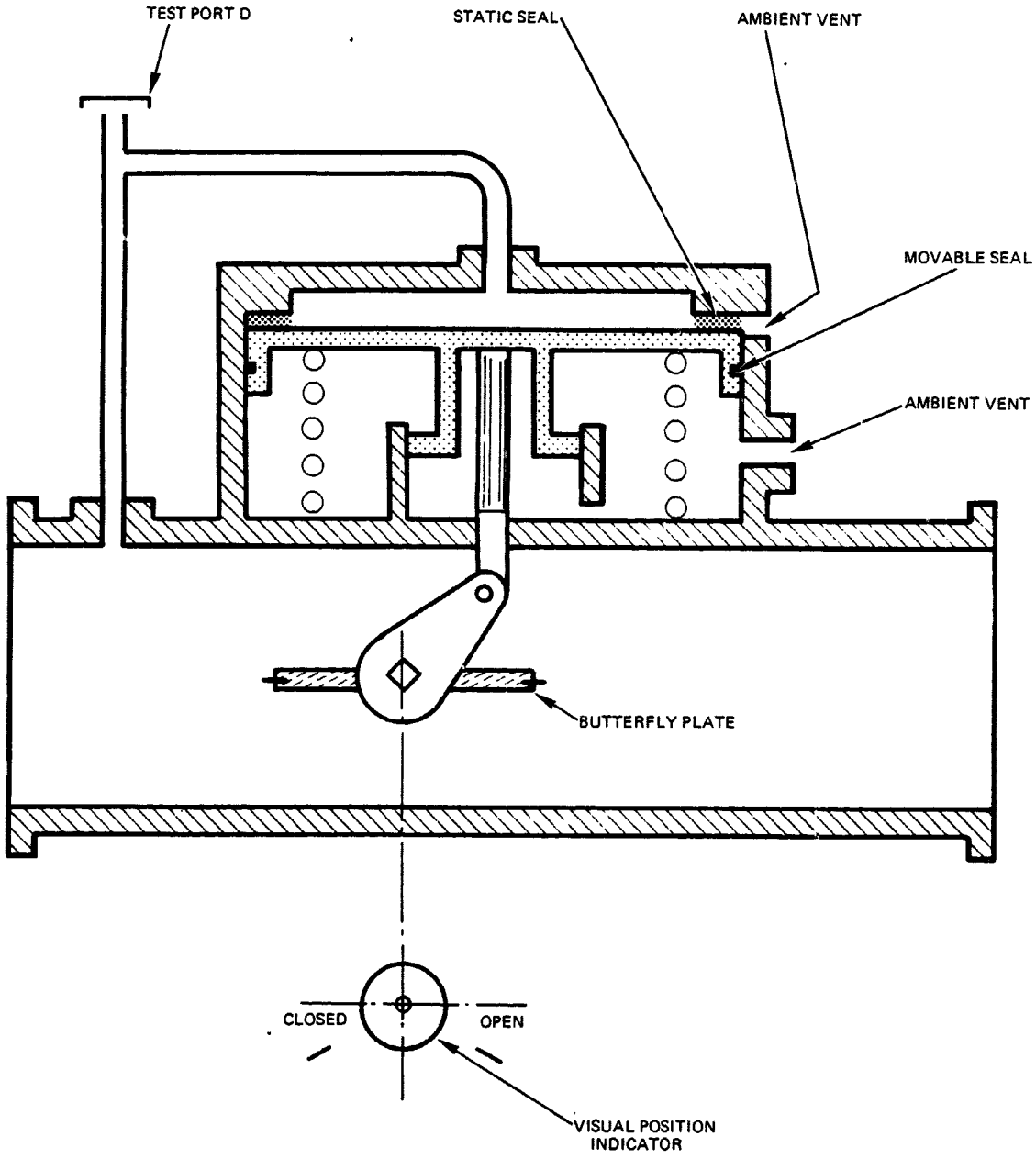
D. Overpressure Valve

- Function : the valve reduces engine bleed air pressure in the event of pressure regulation failure and cuts off air supply as soon as pressure exceeds a preset value.
- Operation : the valve is of the butterfly type, **6** in. dia., fully pneumatically operated. Under normal conditions, the valve is spring-loaded open by the pneumatic actuator. When upstream pressure reaches a

preset value, the load exerted on the piston overcomes the spring load and the valve starts to close.
The valve is set to start closing within 74 to 79 psig upstream pressure.
If pressure increases, the valve continues to close and reduces downstream pressure. The valve is fully closed for a 90 psig upstream pressure.
Once closed, the valve will open again only for an upstream pressure lower than or equal to 40 psig.

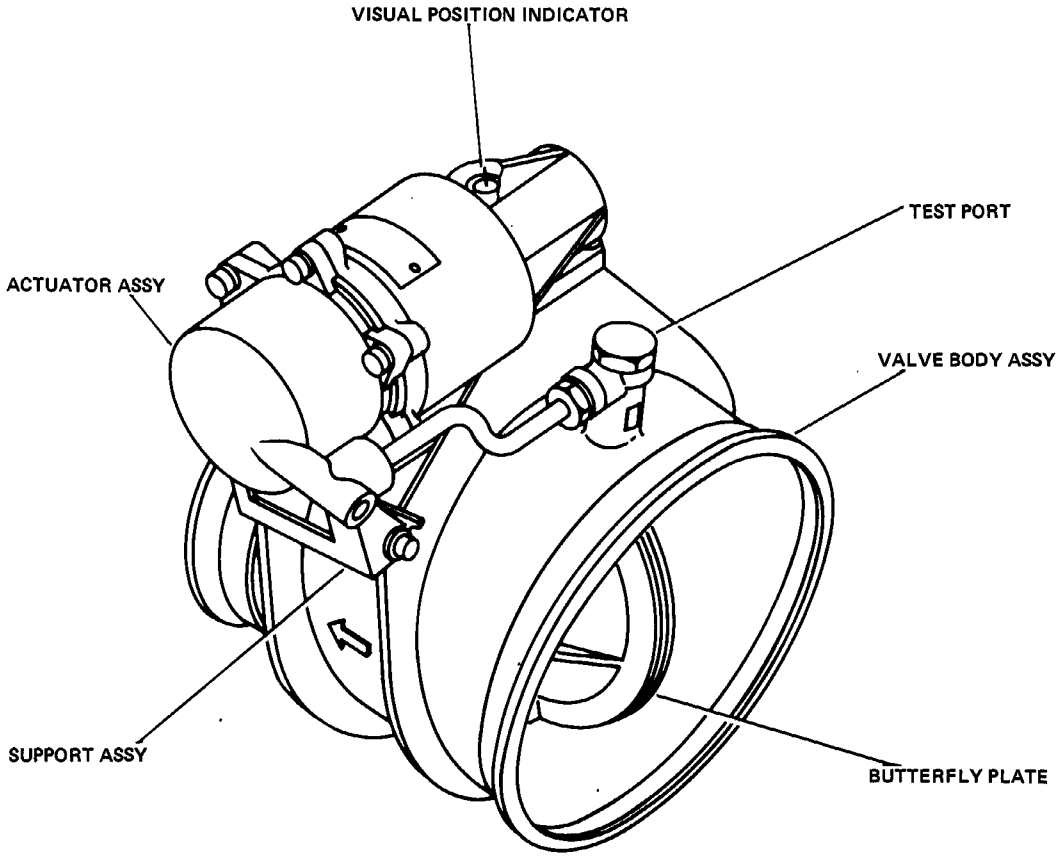
- Emergency control, safety devices and indicating
  . no manual control is provided
  . a butterfly visual position indicator is installed on the butterfly plate.

(Ref. Fig. 013)
(Ref. Fig. 014)



BM5 36 11 00 0 AXMO

Overpressure Valve - Schematic
Figure 013



BM5 36 11 00 0 BAMO
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Overpressure Valve - Perspective View
Figure 014

5. Temperature Regulation and Limitation

A. Description and Operation

- Under stabilized conditions, this system limits temperature in downstream system to a level compatible with the following conditions :
  . safety dictated for air systems routing out of the fire zones,
  . design and performances of the refrigeration unit packs and the wing ice protection system
  . adaptations to engine starting conditions.
- Under all transient conditions, the temperature regulation system should not respond too rapidly, so that the overheat safety system does not trigger, particularly in the following cases :
  . IP - HP bleed air transfer, associated to a rapid engine speed decrease
  . rapid engine speed increase
  . rapid increase of conditioning air flow
  . opening of the wing ice protection system.

To meet such conditions bleed air flows through an air to air heat exchanger located downstream of the overpressure valve, on the upper part of the engine pylon. This air to air heat exchanger is called precooler : the precooler is a tubular steel assembly with crossflow air routing configuration.

The precooler cools the hot air from the engine compressor by a heat exchange process, using cold air bled from the engine fan.

Engine bleed air temperature regulation is achieved by controlling the air flowrate from the engine fan by means of the fan air valve. This is a temperature regulator butterfly valve, pneumatically operated and electrically controlled. The valve is controlled by the pneumatic controller which receives electrical signals from a temperature control sensor located downstream of the precooler.

Cooling air is ducted through the precooler and then discharged overboard through holes drilled in pylon outer face.

The regulated temperature value varies, according to following conditions.

. with wing ice protection off :
  regulated temperature : 177°C ±12°C (350°F ±21°F).

. with wing ice protection on.
  regulated temperature : 227°C ±12°C (441°F ±21°F).

The muscle pressure of the fan air valve is tapped upstream of the bleed valve and is limited by a relief valve ; the relief valve is closed as long as upstream pressure is lower than 163 psig.

When subjected to muscle pressure and with no current applied to the torque motor, the fan air valve is open to allow maximum cooling of conditioning air ; in the absence of muscle pressure, the valve is spring-loaded closed.

The electrical signals transmitted from the sensor to the pneumatic controller are transformed so that :

. the valve is fully closed for regulation of lower limits (165°C or 215°C)
. the valve is fully open for regulation of upper limits (189°C or 239°C).

The temperature control sensor located downstream of the precooler includes

two sensing elements generating signals : one for temperature regulation (as above mentioned), the other for overheat detection and fault detection. Therefore, when the temperature at the precooler outlet is excessive, signals are fed to the pneumatic controller which commands air bleed automatic shut off by closing of the bleed valve.
Precooler overheat temperature varies depending on whether the wing ice protection system is operating or not.

. With wing ice protection off : overheat at 207°C ±3°C.
. With wing ice protection off and in flight with one air bleed inoperative : overheat at 255°C ±3°C.
. With wing ice protection on : overheat at 255°C ±3°C.

B. Fan Air Valve

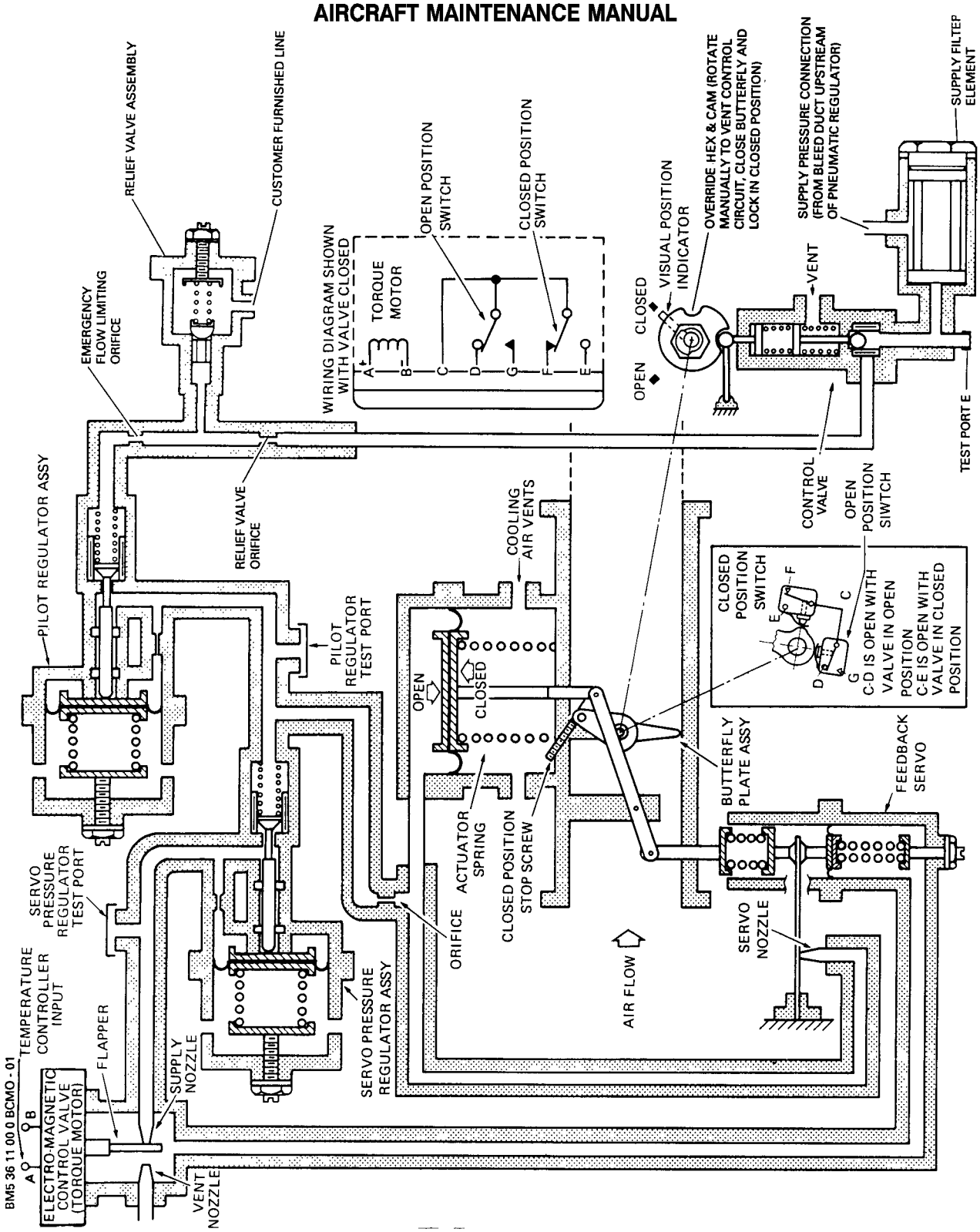
. The valve is of the butterfly type, 8 in. dia., pneumatically operated and electrically controlled by a torque motor which can modify the muscle pressure according to the signals transmitted from the controller.
The fan air valve is designed to control the cooling airflow ducted through the precooler in order to limit and to regulate the engine bleed air temperature.
. Opening and regulation
Control air tapped upstream of the bleed valve is routed through a filter to the pilot regulator assembly which delivers constant pressure to the servo pressure regulator and the feedback servo. Control pressure enters the actuator upper chamber and, when upstream pressure exceeds 20 psig, enables the actuator diaphragm to overcome the actuator spring force, thus causing the butterfly to open.
The servo pressure regulator is set at a pressure lower than that of the pilot regulator assembly, to enable valve operation when pressure decreases below the normal setting of the pilot regulator assembly.
  - When the current applied to the torque motor is null or lower than 5 mA, control pressure is at its maximum and the valve is fully open.
  - When power is supplied to the torque motor, the flapper is positioned away from the supply nozzle, thus creating a pressure in the feedback servo, proportional to the current applied to the torque motor. This pressure acting on the feedback servo diaphragm overcomes feedback servo spring force and causes the flapper to move away from the feedback servo nozzle. This movement reduces the supply pressure in the actuator upper chamber by venting pressure to ambient, thus causing the butterfly plate assembly to move towards the closed position. The butterfly plate movement towards the closed position, positions the flapper towards the feedback servo nozzle again and increases the force on the feedback spring until the feedback spring balances the force increase due to the increase in torque motor current. Therefore, the butterfly plate assembly has a unique position for each value of current applied to the torque motor.

  A lever system between the actuator and the butterfly reduces the passage area variation rate in order to improve stability when valve position is near to closed.
. Closing
In the absence of muscle pressure, the valve is spring-loaded closed. When the current applied to the torque motor exceeds a preset value

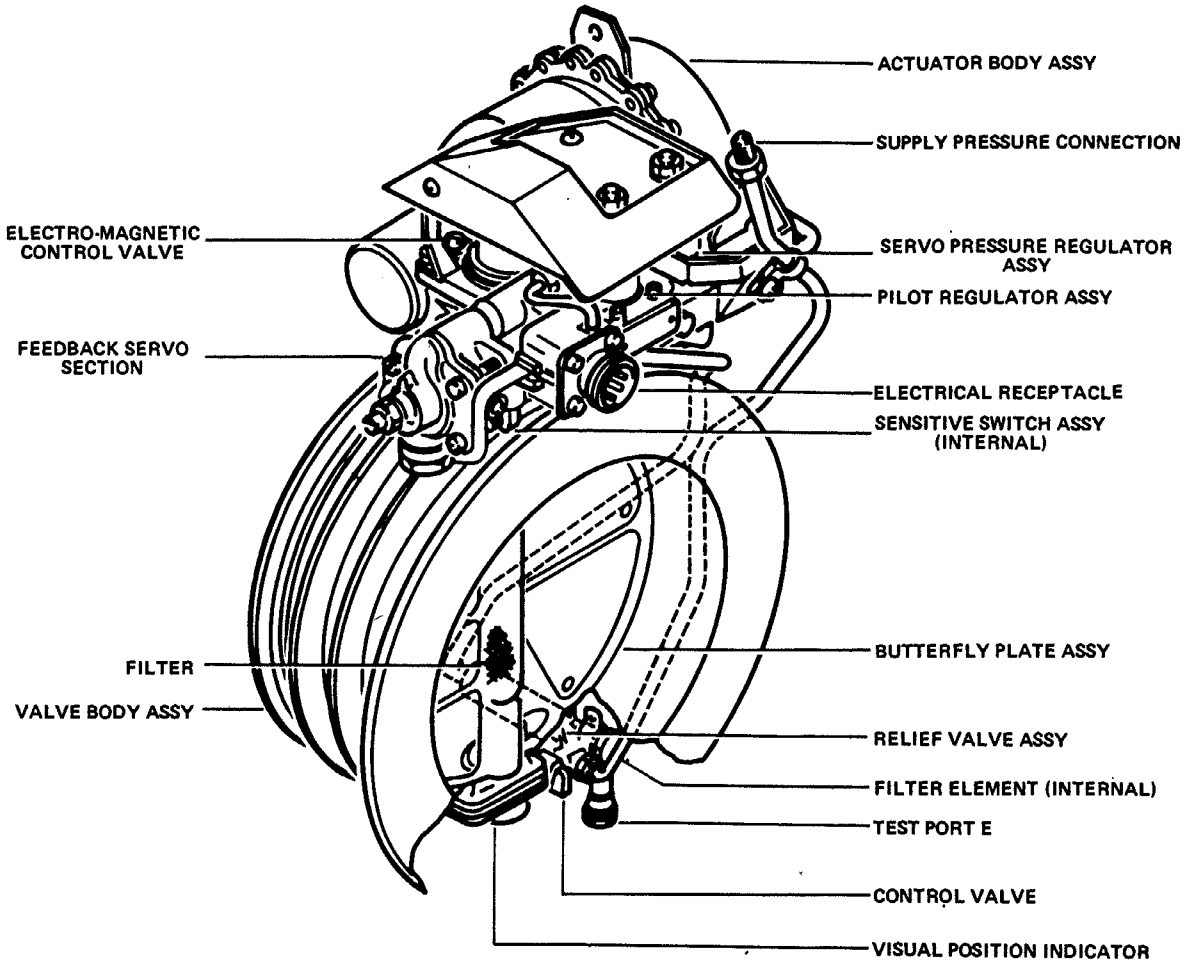
(1200 mA), the flapper moves fully away from the supply nozzle, creating such a force in the feedback servo mechanism that the actuator upper chamber is permanently vented ; the valve closes under the load exerted by the actuator spring.

. Emergency control, safety devices and indicating
The valve incorporates a manual override which consists of a hex head which lifts a ball from its seat by means of a rod, thus venting supply pressure and resulting in full closing of the valve. The valve is therefore locked in closed position.
A relief valve limits muscle (supply) pressure entering the valve and causes air to flow back to aircraft air supply system. The relief valve delivers 1.8 lb/mn at 190 psig and 30°C ±50°C and remains closed as long as upstream pressure is lower than 163 psig.
A small quantity of cooling air is admitted into the pneumatic actuator for ventilation purposes.
Two limit position microswitches are actuated by an actuator arm attached to the butterfly shaft and transmit information to the controller.
The manual override incorporates a valve butterfly position indicator.
The valve is provided with a test port to perform the in situ test.
(Ref. Fig. 015)
(Ref. Fig. 016)

C. Control of Temperature Regulation
Operation of temperature regulation at the precooler outlet, already described in paragraph 4.A., is schematized.
(Ref. Fig. 017)

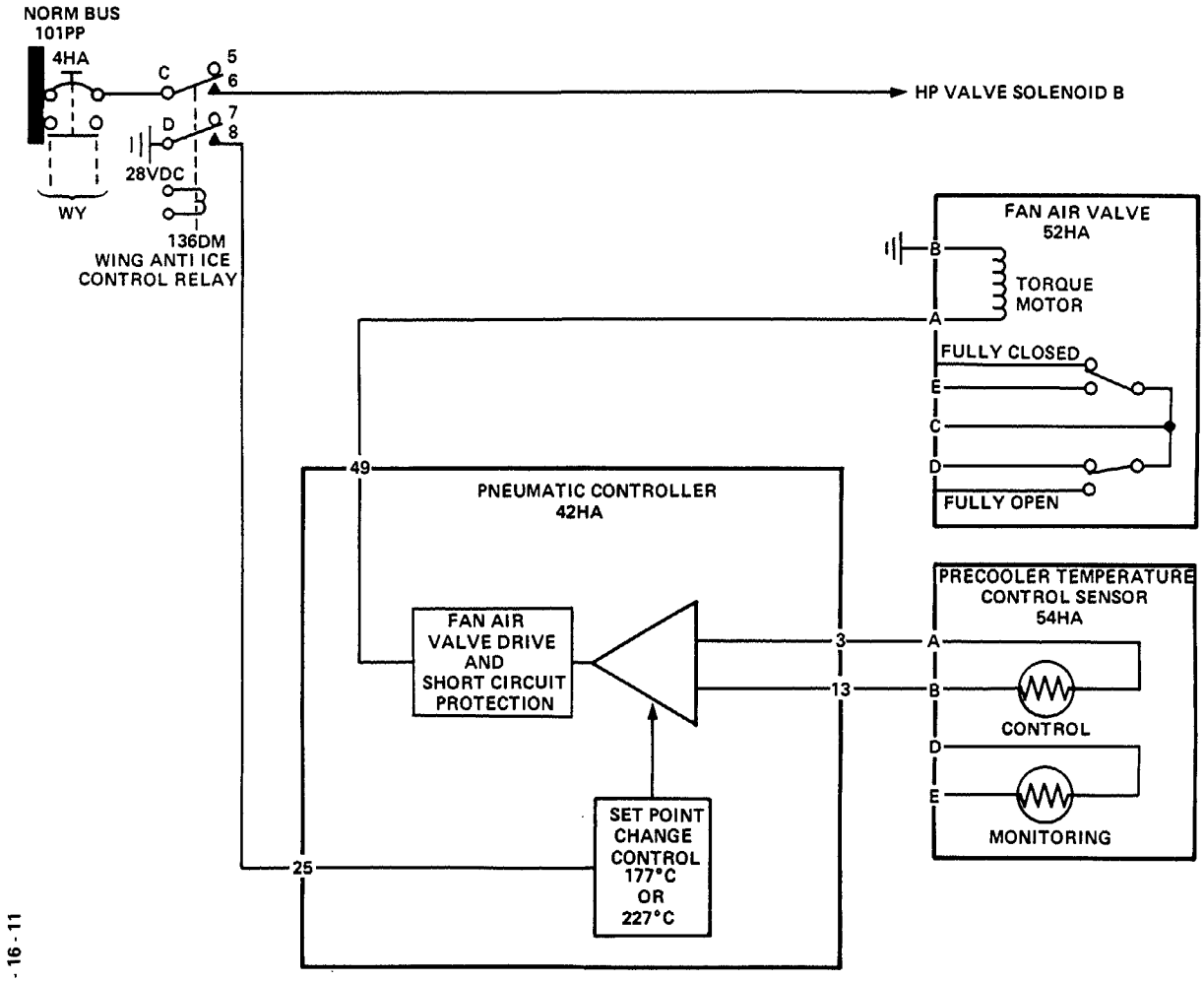


Fan Air Valve - Schematic
Figure 015



BM5 36 11 00 0 BFMO - 12 - 08
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Fan Air Valve - Perspective View
Figure 016



BM5 36 11 00 0 BGMO-16-11
DM5

Fan Air Valve - Electrical Schematic
Figure 017

6. Fault Detection and Isolation of Pressure and Temperature Regulation Systems - Test Devices

A. Description and Operation

The purpose of this system is to detect failures and abnormal operation of the engine bleed air supply system and to warn the crew by transmitting the relevant information to the right and left ECAM display units and by triggering annunciator light illumination.
The system also enables failures and abnormal operation to be recorded during flight, in order to facilitate replacement on the ground of faulty components. Moreover, systematic check of each component can be performed on the ground.
The system related to each engine includes :
. a Chromel Alumel high stage temperature sensor (TE)
. a high stage pressure sensor (pressure upstream of the HP valve) (PE)
. a regulator pressure sensor (pressure downstream of the bleed valve) (PR)

**ON A/C 001-005,

. an electronic assembly integrated in the pneumatic controller which processes information from these components, from HP valve closing limit microswitches, from bleed valve differential pressure switch (upstream pressure less downstream pressure) and from fan air valve opening and closing limit microswitches.
A section of the electronic assembly generates signals to trigger illumination of the annunciator lights.
Another section of the controller designated BITE (Built In Test Equipment) includes magnetic core memory circuits and facilitates on the ground failure identification and check of components under maintenance. (Ref. paragraph 5.B.).

R **ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

. an electronic assembly integrated in the pneumatic controller which processes information from these components, from HP valve closing limit microswitches, from bleed valve differential pressure switch (upstream pressure less downstream pressure) and from fan air valve opening and closing limit microswitches.
A section of the electronic assembly generates signals to trigger illumination of the annunciator lights.
Another section of the controller designated BITE (Built In Test Equipment) includes a non volatile memory and facilitates on the ground failure identification and check of components under maintenance. (Ref. paragraph 5.B.).

R **ON A/C 001-100,

. a selector switch and PTT pushbutton switch located on the maintenance

panel are designed to check continuity of **BLEED FAULT** warning circuit Continuity initiates illumination of annunciator lights, activation of the **ECAM** system (chime and **AIR** warning light), discontinuity of the flowline on the overhead panel.
Upon test completion the system must be reset (**BLEED VALVE** pushbutton switch released out (**OFF/R**)).

B. Operation with Engine Bleed Air Supply
In flight, the electronic assembly monitoring the engine bleed air system detects failures of the various components and warns the crew by illumination of one of the two legends in the flight compartment :
FAULT legend of **HP VALVE** pushbutton switch or of **BLEED VALVE** pushbutton switch, as per a logic diagram already described in paragraphs **2.C** and **3.C.**

**ON A/C 001-005,

Failures of pneumatic or mechanical origin, i.e. which cannot be isolated on the ground by simple electrical tests, are recorded in the five magnetic memory circuits of the **BITE**, for interrogation on the ground by the maintenance personnel, without using a pneumatic air source.

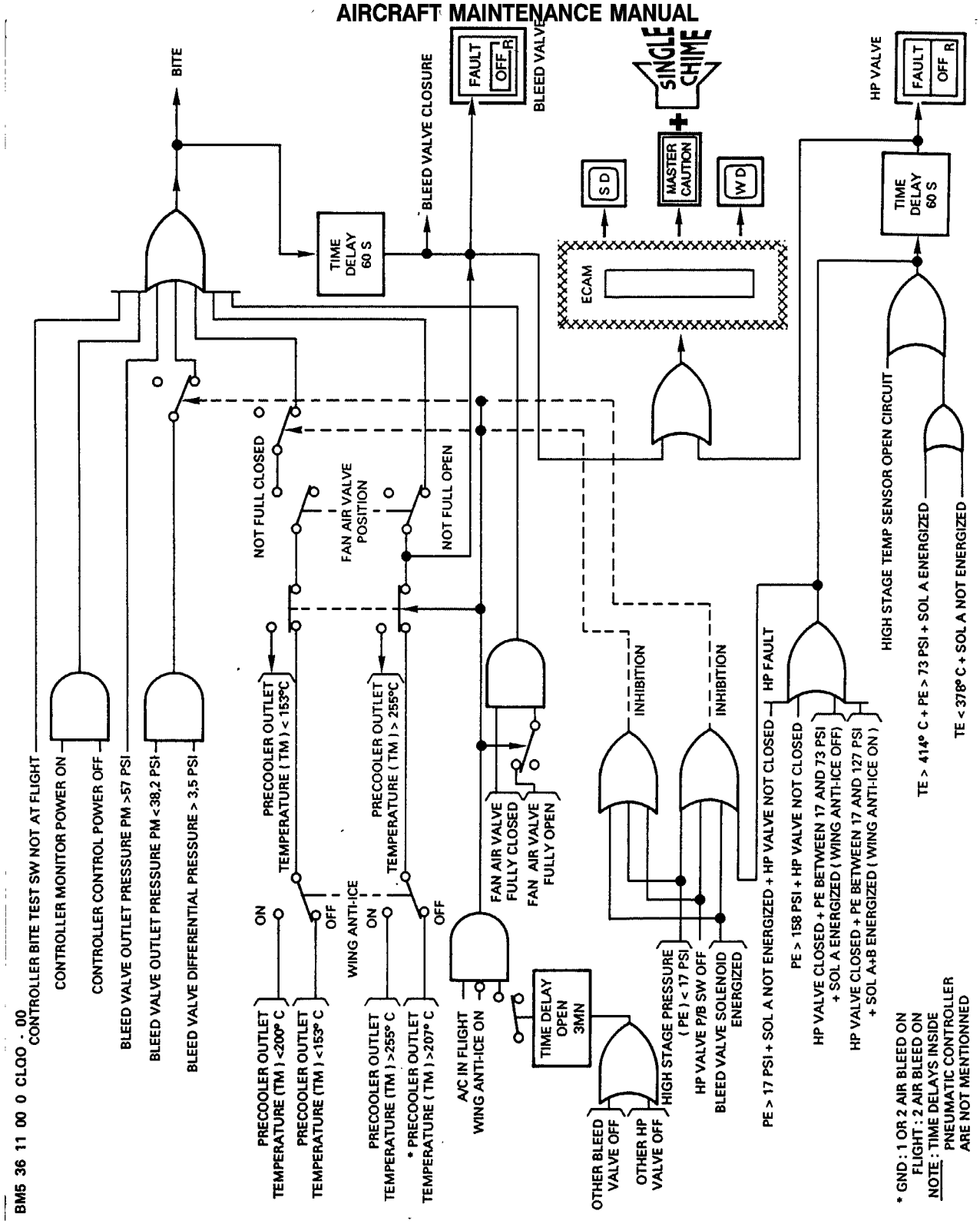
R **ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

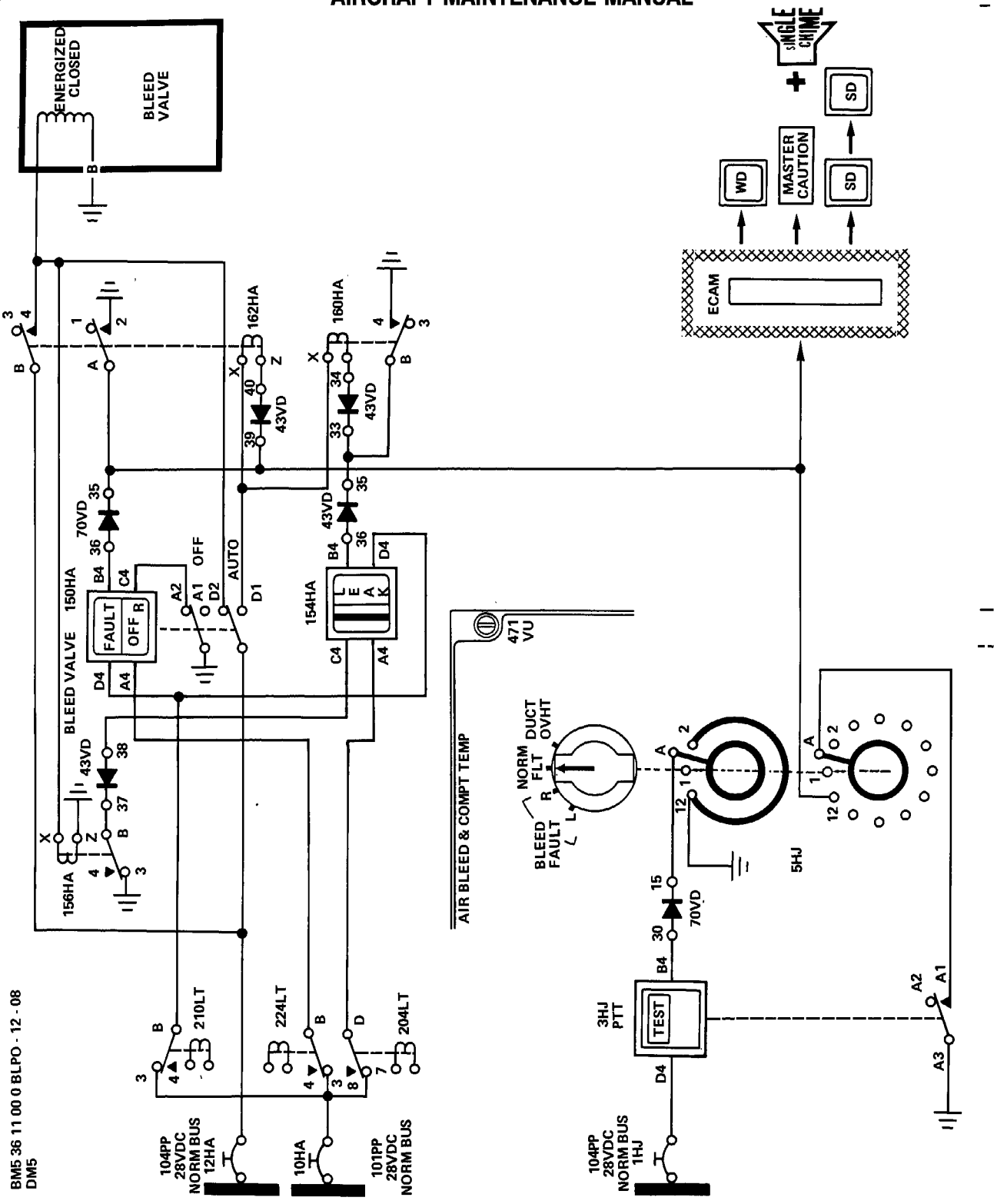
Failures of pneumatic or mechanical origin, i.e. which cannot be isolated on the ground by simple electrical tests, are recorded in the non volatile memory of the **BITE**, for interrogation on the ground by the maintenance personnel, without using a pneumatic air source.

R **ON A/C 001-100,

Failures associated with illumination of **FAULT** legend on **HP VALVE** pushbutton switch are recorded in the memory circuits of the **BITE** after a 60 second time delay when wing anti-ice is not selected.
(Ref. Fig. 018)
(Ref. Fig. 019)



Engine Bleed Air Warning Logic
Figure 018



Bleed Fault Test
Figure 019

C. Description and Operation of the BITE
(1)Description

**ON A/C 001-005,

(Ref. Fig. 020)
(Ref. Fig. 021)
(Ref. Fig. 022)
(Ref. Fig. 023)

R **ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

(Ref. Fig. 024)

**ON A/C 001-005,

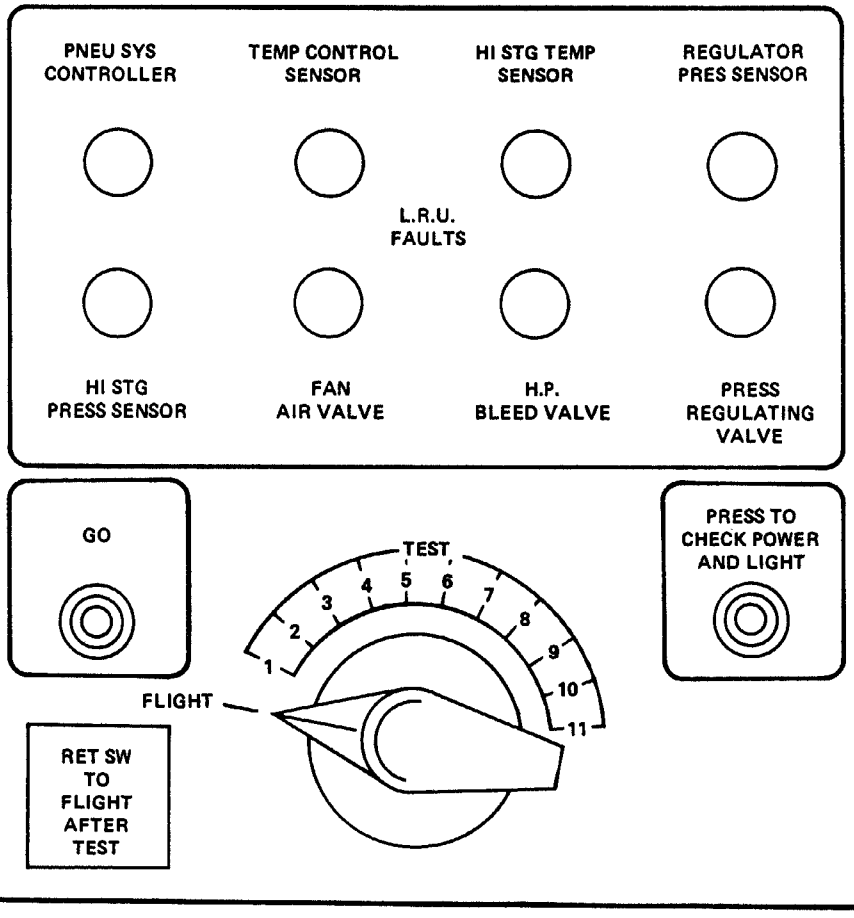
All circuits and components required by the BITE are integrated in the controller electronic assembly.
The latter includes the following :
- a twelve-position TEST switch, 34 circuits accessible from the face of the controller,
- a DC reference voltage generator stage,
- an AC reference voltage generator stage,
- a comparator stage,
- a logic stage,
- a memory write and read stage,
- an indicating system comprising 8 red lights, one green light and one yellow light located on the face of the electronic assembly.

(2)Operation
TEST switch
FLIGHT position : Normal in flight position.
De-activates BITE control
Cancels fault memory.
Position 1 : Controller self testing.
Position 2 : Test of HP valve control stage and memory interrogation
Positions 3 to 7 : Controller self testing.
Position 8 : Test of high stage temperature sensor circuit and interrogation of sensor memory.
Position 9 : Test of high stage pressure sensor then interrogation of HP valve memory.
Position 10 : Test of regulator pressure sensor then interrogation of bleed valve memory.
Position 11 : Test of temperature control sensor then interrogation of fan air valve memory.
Lights
GO green indicator light : indicates that test is OK.
Red warning lights : indicate that a component or its associated

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. WAITING FOR 'GO' - GREEN LIGHT - IN EACH POSITION, ROTATE TEST SWITCH THROUGH POSITIONS 1 TO 11. DISREGARD ANY MOMENTARY LIGHT FLASHES AND RECORD ONLY STEADY STATE INDICATIONS.
3. IF 'L.R.U. FAULT' IS INDICATED - RED LIGHT - IN ANY POSITION STOP TEST. REPLACE CORRESPONDING L.R.U. RETURN SWITCH TO 'FLIGHT'. REPEAT TEST.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



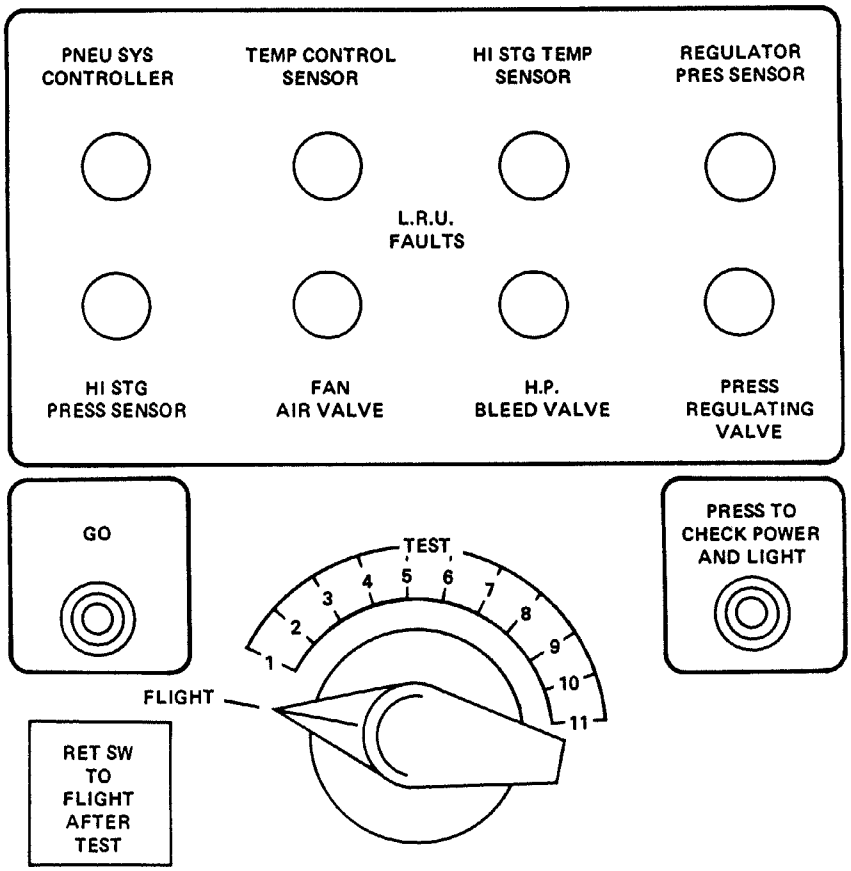
BM5 36 11 00 0 BNPO - 01/28 - 01/23
DM5

BITE Controller
Figure 020

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. WAITING FOR 'GO' - GREEN LIGHT - IN EACH POSITION, ROTATE TEST SWITCH THROUGH POSITIONS 1 TO 11. DISREGARD ANY MOMENTARY LIGHT FLASHES AND RECORD ONLY STEADY STATE INDICATIONS.
3. IF 'L.R.U. FAULT' IS INDICATED - RED LIGHT - IN ANY POSITION STOP TEST. REPLACE CORRESPONDING L.R.U. RETURN SWITCH TO 'FLIGHT'. REPEAT TEST.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



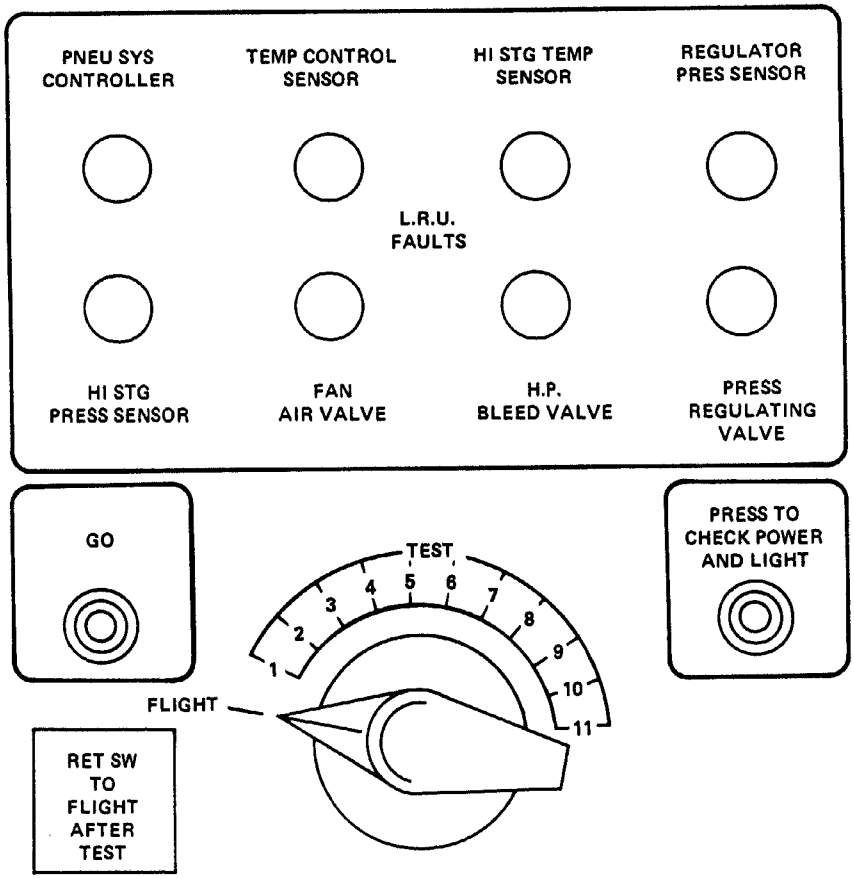
BM5 36 11 00 0 SLMO - 28 - 23
DM5

Pneumatic Controller Front Face Label BITE
Instructions - Existing
Figure 021

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. WAITING FOR 'GO' - GREEN LIGHT - IN EACH POSITION, ROTATE TEST SWITCH THROUGH POSITIONS 1 TO 11. DISREGARD ANY MOMENTARY LIGHT FLASHES AND RECORD ONLY STEADY STATE INDICATIONS.
3. IF 'L.R.U. FAULT' IS INDICATED - RED LIGHT - IN ANY POSITION STOP TEST. REFER TO TSM. RECTIFY. RETURN SWITCH TO " FLIGHT " . REPEAT TEST.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



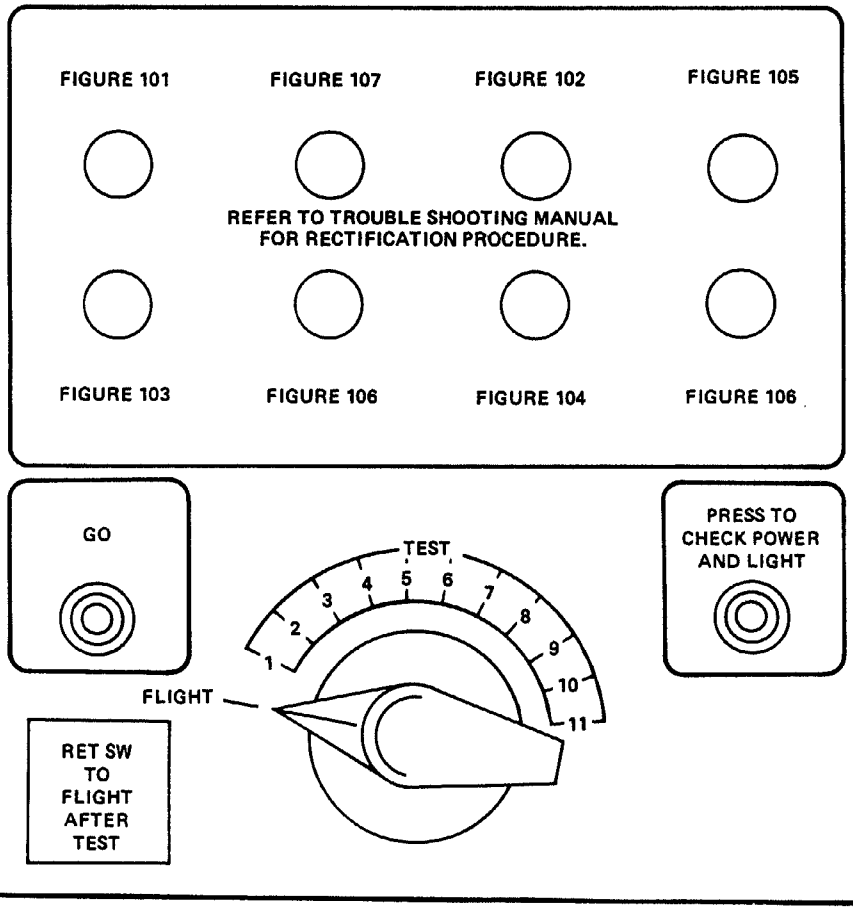
BM5 36 11 00 0 SLNO - 28 - 23
DM5

Pneumatic Controller Front Face Label BITE Instructions - Recommended
Figure 022

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

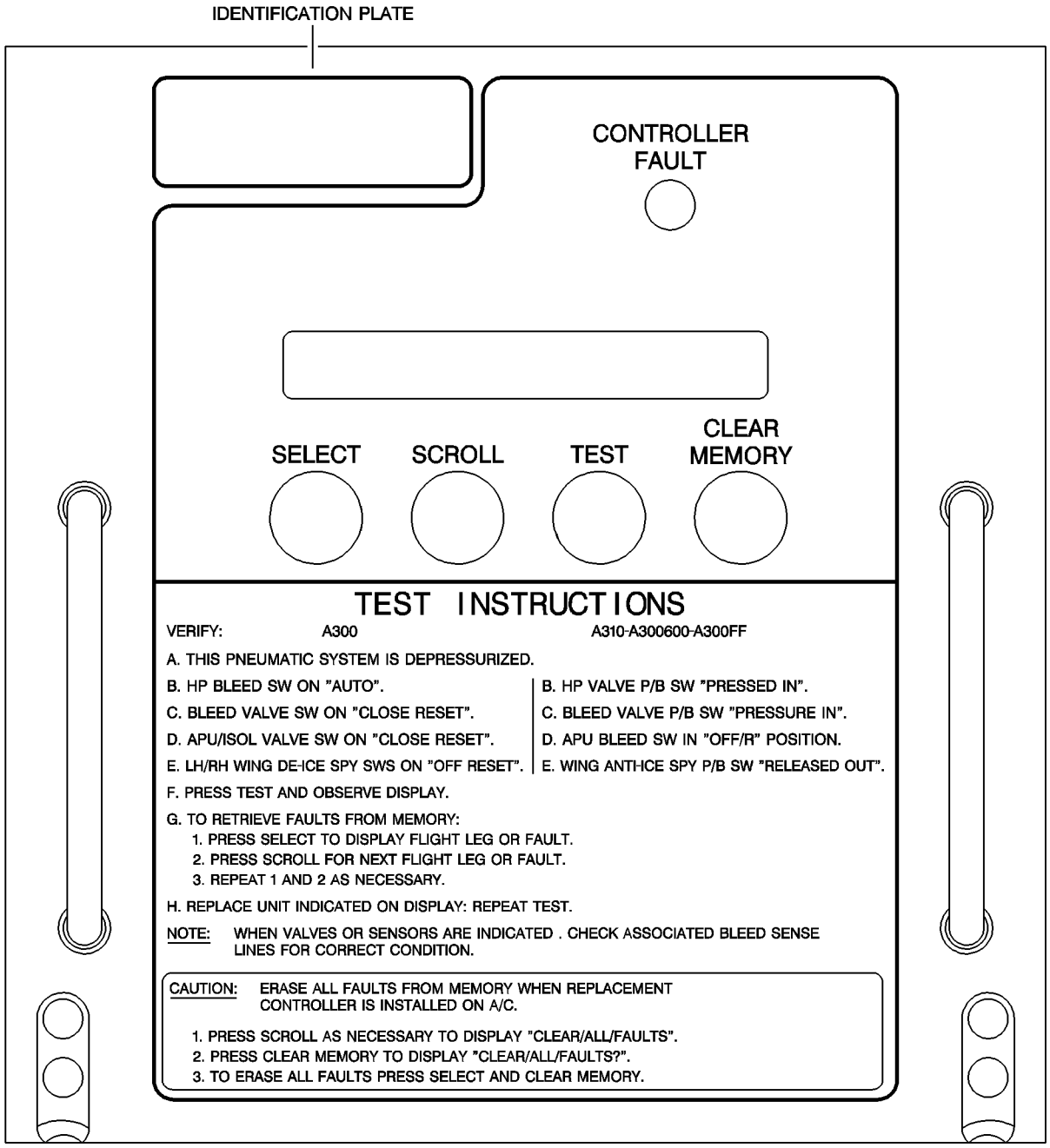
VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. ROTATE TEST SWITCH TO POSITION 1. WAIT FOR SINGLE STEADY INDICATION.
. RED LIGHT. STOP TEST. RECTIFY IN ACCORDANCE WITH TSM.
THEN SWITCH TO " FLIGHT " . THEN REPEAT TEST.
. GREEN LIGHT. PROCEED TO NEXT TEST SWITCH POSITION.
3. REPEAT STEP 2. FOR EACH POSITION 1 TO 11.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



BM5 36 11 00 0 SLPO . 28 - 23
DM5

Pneumatic Controller Front Face Label BITE
Instructions - Recommended Alternate
Figure 023


IDENTIFICATION PLATE
CONTROLLER FAULT
SELECT
SCROLL
TEST
CLEAR MEMORY
TEST INSTRUCTIONS
VERIFY: A300 A310-A300600-A300FF
A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. HP BLEED SW ON "AUTO".
C. BLEED VALVE SW ON "CLOSE RESET".
D. APU/ISOL VALVE SW ON "CLOSE RESET".
E. LH/RH WING DE-ICE SPY SWS ON "OFF RESET".
B. HP VALVE P/B SW "PRESSED IN".
C. BLEED VALVE P/B SW "PRESSURE IN".
D. APU BLEED SW IN "OFF/R" POSITION.
E. WING ANTI-ICE SPY P/B SW "RELEASED OUT".
F. PRESS TEST AND OBSERVE DISPLAY.
G. TO RETRIEVE FAULTS FROM MEMORY:
1. PRESS SELECT TO DISPLAY FLIGHT LEG OR FAULT.
2. PRESS SCROLL FOR NEXT FLIGHT LEG OR FAULT.
3. REPEAT 1 AND 2 AS NECESSARY.
H. REPLACE UNIT INDICATED ON DISPLAY: REPEAT TEST.
NOTE: WHEN VALVES OR SENSORS ARE INDICATED . CHECK ASSOCIATED BLEED SENSE LINES FOR CORRECT CONDITION.
CAUTION: ERASE ALL FAULTS FROM MEMORY WHEN REPLACEMENT CONTROLLER IS INSTALLED ON A/C.
1. PRESS SCROLL AS NECESSARY TO DISPLAY "CLEAR/ALL/FAULTS".
2. PRESS CLEAR MEMORY TO DISPLAY "CLEAR/ALL/FAULTS?".
3. TO ERASE ALL FAULTS PRESS SELECT AND CLEAR MEMORY.

BM5 36 11 00 0 SLQ0 00

Pneumatic Controller Front Face
Figure 024

electrical or pneumatic circuit is faulty and must be repaired or replaced.

Yellow indicator light : indicates that **TEST** switch is not in **FLIGHT** position.

Test procedure

Detailed instructions are provided on the face of the controller and must be strictly followed except that indicated faulty **LRU** must be replaced **ONLY** after confirmation by trouble shooting.

R ****ON A/C 001-100,**

Post **SB 36-2027** For **A/C 001-005,**

The pneumatic controller incorporates a built-in-test for checking correct operation of the computer, ensuring the monitoring of the computer and of the engine bleed air system.

The built-in-test operation is ensured by microprocessor based circuitry which includes :

- Central processing unit
- Hardware/Software interface for the analog inputs
- Hardware/Software interface for the discrete inputs
- Continuous control hardware built-in-test capability
- Continuous system hardware built-in-test capability
- Fault storage and display
- Watchdog refresh capability
- Power supply monitor

To access to the built-in-test the front panel of the pneumatic controller contains a 16 alphanumeric character display for displaying faults and four pushbutton switches. Pushbuttons allow the stored fault information to be cycled on the display for review by the maintenance personnel. The display is normally off unless the controller is commanded into initiated built-in-test by pressing one of the pushbuttons while the aircraft is on the ground.

The four pushbuttons operate the display and memory erase functions. The four pushbuttons are labeled **SCROLL, SELECT, TEST** and **CLEAR MEMORY.**

The front panel also includes a red light labeled **CONTROLLER FAULT** to indicate a **CPU** failure.

(2)Operation

3 different tests are performed by the pneumatic controller

- Power-up test
- Continuous built-in-test
- Initiated built-in-test

(a)Power-up test

Power-up test is performed upon the application of the electrical power to the aircraft.

Power-up test is a subset of continuous built-in-test, performing a self test of the power supplies, Central Processing Unit, and the memory circuits prior to allowing the processor to perform its functions.

If power-up test is not correct, controller fault will be stored in

non-volatile memory and the BLEED VALVE/FAULT warning light will be illuminated.
The power-up test shall be finished within 4 seconds.

(b)Continuous built-in-test
Continuous built-in-test (C-BITE) is only an observer to the system and provides no control of the system.
C-BITE is active during normal operation of the pneumatic controller whenever electrical power is applied and power built-in-test is successfully completed. All valve, sensor, and controller components in the pneumatic system are subject to continuous testing.
Confirmed faults are stored in non-volatile memory.
During C-BITE the following tests are performed :
- program memory test
- Power Supply test
- Analog to digital conversion test
- high pressure bleed valve solenoid A driver short circuit test
- high pressure bleed valve solenoid A driver open circuit test
- fan air valve drive open circuit test
- fan air valve drive short circuit test
- TE sensor interface test
- TM control sensor interface test
- TM monitor sensor interface test
- Setpoint logic test

(c)Initiated built-in-test (Ref. Fig. 025)
The initiated built-in-test (I-BITE) capability is provided in the built-in-test state. Its purpose is to provide active fault detection for selected parts of the pneumatic controller.
The I-BITE starts when the TEST pushbutton on the front face of the pneumatic controller is pressed. At the start of the I-BITE, all of the front panel display are turned on for 5 seconds. At the same time a zero pressure check test is performed. If either PM (downstream precooler pressure) or PE (high stage pressure) is greater than 10 psig the system is considered pressurized and I-BITE will abort. If no pressure is detected during the zero pressure check test, then the aircraft engine type will be displayed on the front panel for 5 seconds, followed by the pneumatic controller part number for 5 seconds. Following this, the I-BITE capability will perform 9 tests in the sequence specified below :

Test sequence	Fault Message displayed
Pressure Sensor Interface Test	CONTROLLER
PE Zero Pressure Test	HI PRESS SNSR
PM Zero Pressure Test	REG PRESS SNSR
TM Monitor Undersupply Test	CONTROLLER
TM Control Functioning High Test	CONTROLLER
TM Control Functioning Low Test	CONTROLLER

Test sequence	Fault Message displayed
FAV Torque Motor Winding Open Circuit Test	FAN AIR VALVE
Solenoid A Driver Open Circuit Test	CONTROLLER
Solenoid A Driver Short Circuit Test	CONTROLLER

If all tests in the I-BITE capability pass, the message TEST OK is displayed.
At the first detected failure, the I-BITE capability asserts the appropriate faulty component.
The I-BITE shall be finished within 40 ± 4 seconds

(d)Fault storage capability

The fault storage capability is provided in the built-in-test. This capability causes fault messages to be stored in the non-volatile memory.
5 sets of fault records can be stored in the non-volatile memory, one for the current flight leg and 4 for the last 4 flight legs prior to the current flight leg. When a new flight leg is detected, the fault storage capability shifts each set of fault records into the previous flight leg record and, if 4 sets of fault records have already been stored, discards the fault record for the oldest flight leg.
A new flight leg is detected when both the high stage and the downstream precooler pressures are less than or equal to 15 ± 2 psig for at least 60 ± 6 seconds, then change to greater than 15 ± 2 psig for at least 60 ± 6 seconds.
If a fault is detected by the continuous built-in-test, the corresponding fault message is stored in the non-volatile memory.

(e)Front panel display

By using two eight character display segments configured in a single row of 16 characters, the following is achieved :
- the first character indicates the flight leg with C indicating the current flight and 1 through 4 indicating the previous one to four flights.
- the second character is a blank.
- the remaining thirteen characters will displayed the failed LRU.

The fault messages are listed in the table below :

Fault Message	Corresponding Fault Data
X CONTROLLER	Controller fault
X HI PRESS SNSR	PE fault
X REG PRESS SNSR	PM fault
X HI TEMP SNSR	TE sensor fault

Fault Message	Corresponding Fault Data
X REG TEMP SNSR	TM control sensor fault or TM monitor sensor fault
X HP VALVE	HSV closed fault or HSV open fault
X FAN AIR VALVE	FAV fault
X PRESS REG VLV	PRV reg low or PRV reg high

NOTE : In the table above "X" is used to indicate the flight leg number, C for the current flight leg and 1, 2, 3, 4 for the previous flight legs, 4 being the oldest.

(f)Front panel pushbutton switches

4 pushbutton switches are provided on the front panel :

1 - SELECT

This switch allows the operator to select one of the following modes :

- display current flight leg
- display faults
- clear all faults

2 - SCROLL

This switch is used to scroll through the flight leg and to scroll through the fault data to sequencially display all faults of the selected flight leg.

3 - TEST

This switch is used to start the initiated built-in-test.

4 - CLEAR MEMORY

This switch is used to erase the faults from the non-volatile memory. To clear faults from the memory, process as indicated on the front face of the pneumatic controller :

- press SCROLL as necessary to display CLEAR ALL FAULTS
- press CLEAR MEMORY to display CLR ALL FAULTS ?
- to erase all faults press SELECT and CLEAR MEMORY simultaneously.

When erasure is in progress the message ERASING is displayed. When erasure process is finished the message CURRENT FLIGHT is displayed.

(g)Setpoint logic change

The pneumatic controller is common for aircraft powered with General Electric engines or with Pratt & Whitney engines. The software is different for the 2 engines types. The software change is provided by a pin programming.

The controller identifies the engine manufacturer installed on the aircraft by display when the initiated built-in-test is performed. PW ENGINE, GE ENGINE or ?? ENGINE when pin programming is not wired, is displayed.

(h)Central processing unit monitoring

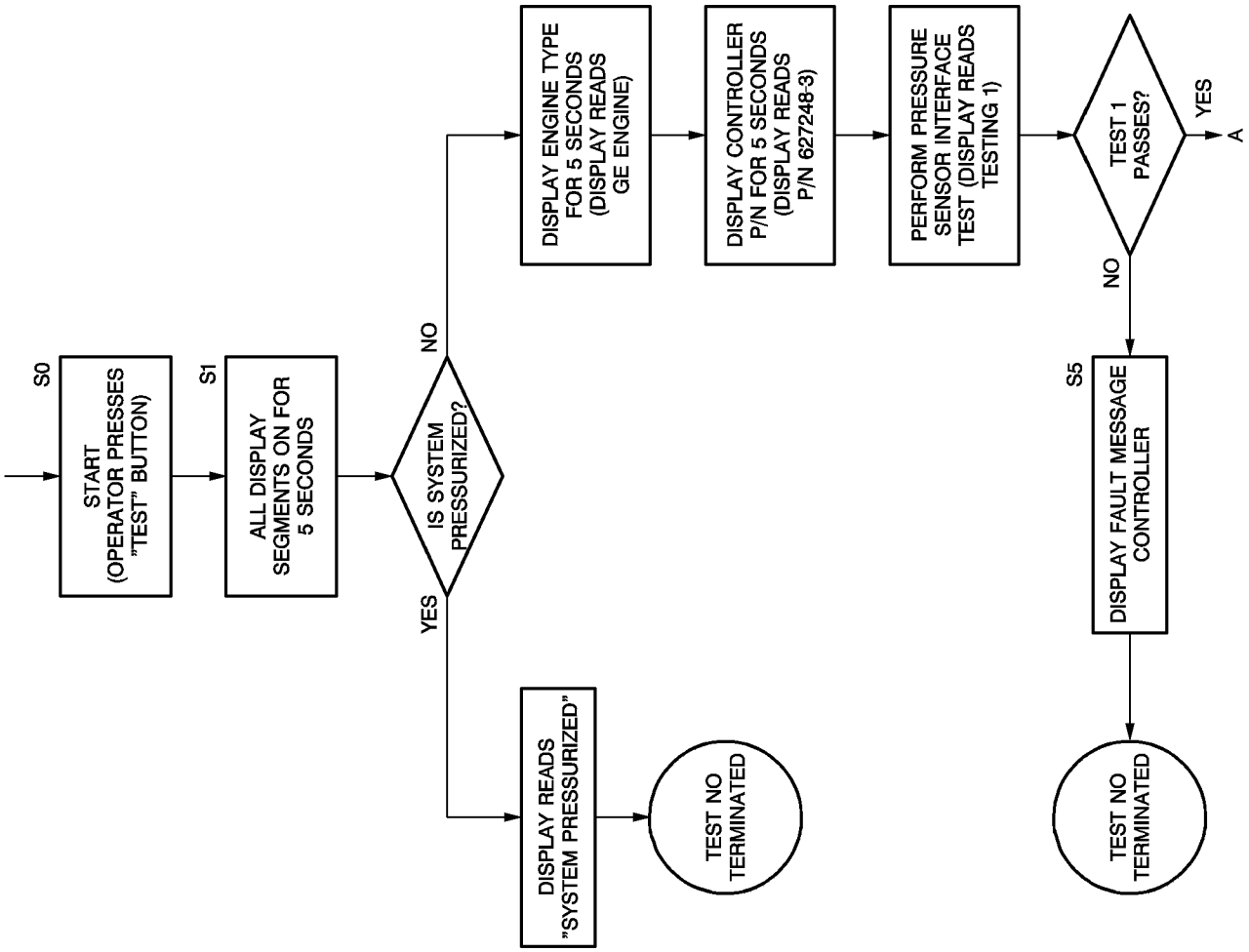
The pneumatic controller contains a latch-out capable to proceed to the

inhibition of the computer when central processing unit failure is detected.
When central processing unit failure is detected the **CONTROLLER FAULT** red light on the front face is latched and the **BLEED VALVE/FAULT** warning light on panel **436VU** is illuminated.
The reset can be performed after manual switch on/off of the electrical power supply to the controller.

(i) Fault storage reading

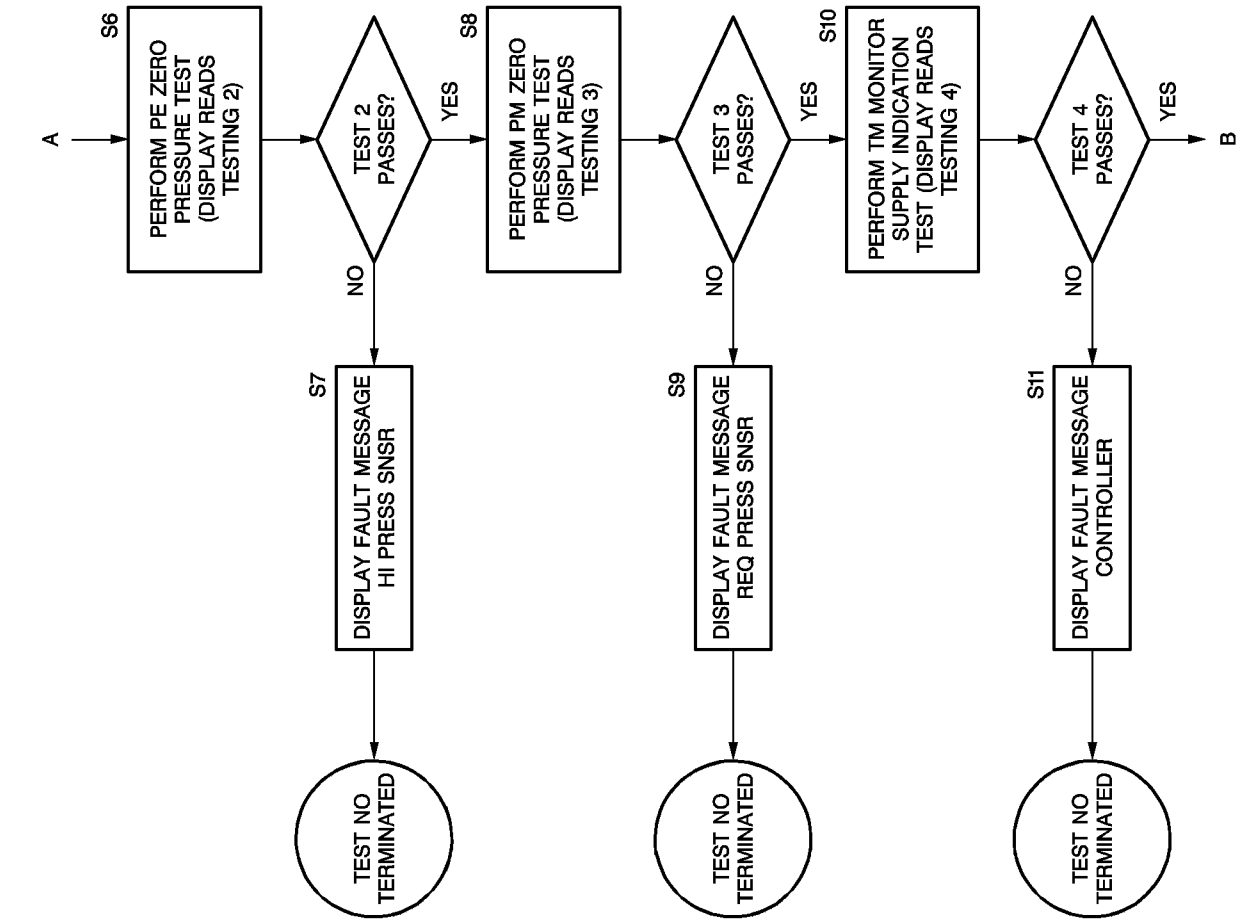
The procedure to retrieve faults from memory is described on the front face of the pneumatic controller.
When no fault messages have been stored in the flight leg being accessed the message **NO FAULTS** is displayed.
When fault messages have been stored the faulty system **LRU** will be displayed in the concerned flight leg. By depressing **SCROLL** pushbutton the display message :

- changes to the fault message for the next fault in the list for the same flight leg,
- changes to **NO MORE FAULTS** if the fault message currently displayed is the last of the list,
- changes to the first fault message in the list for the same flight leg if the message **NO MORE FAULTS** is currently displayed.
- does not change if the current message displayed is **NO FAULTS**.

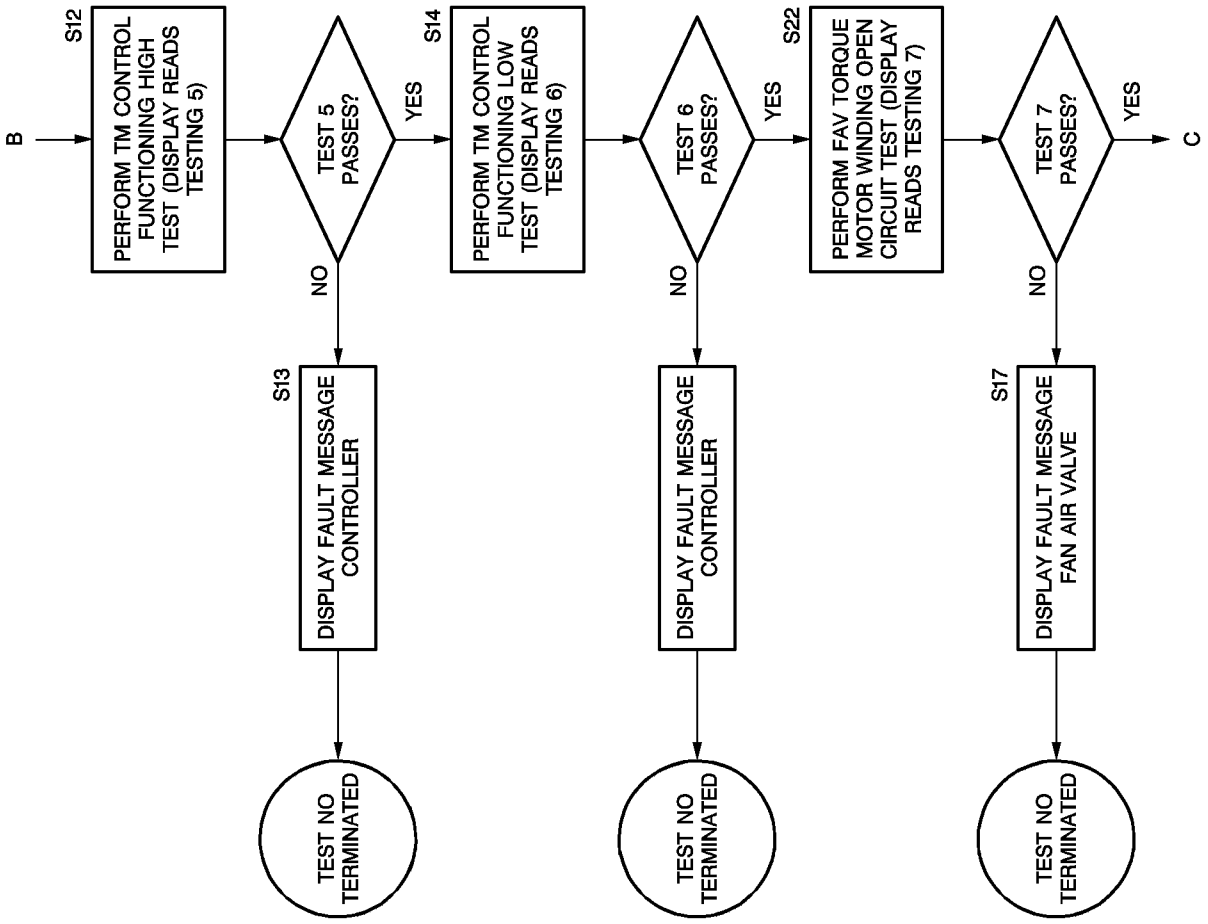


BM5 36 11 00 0 SLRC 00

Initiated Built-in-Test Flow Diagram (Sheet 1)
Figure 025

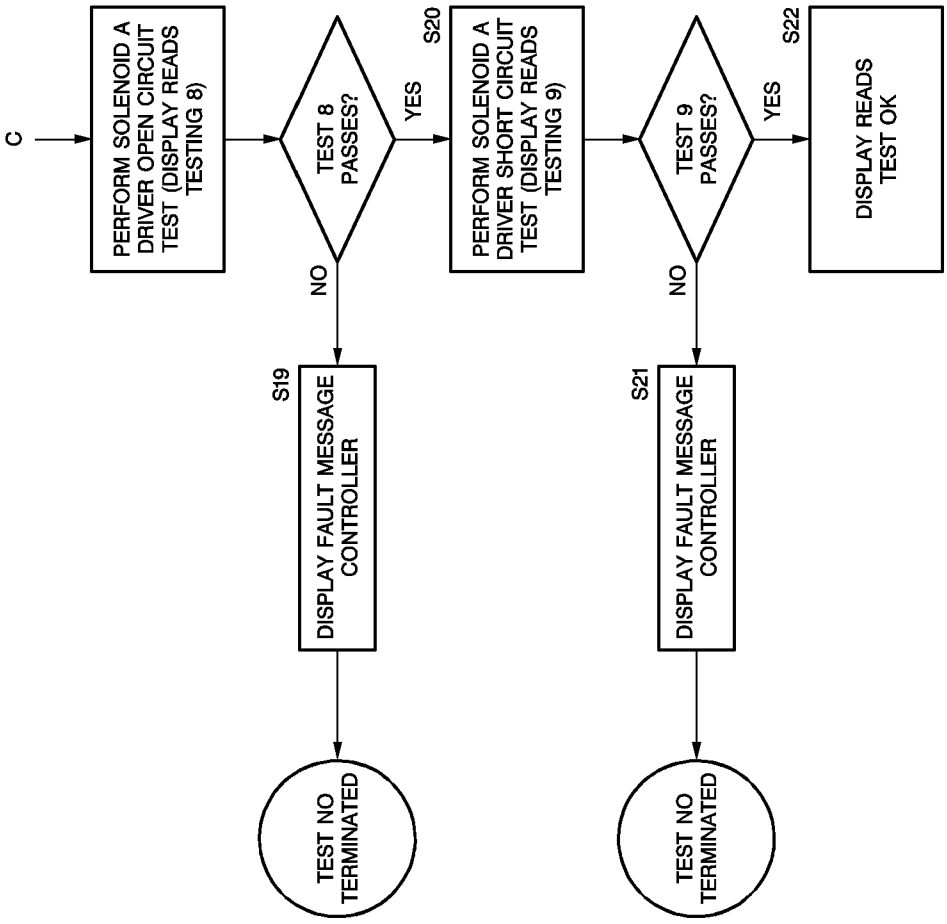


Initiated Built-in-Test Flow Diagram (Sheet 2)
Figure 025



BM5 36 11 00 0 SLRG 00

Initiated Built-in-Test Flow Diagram (Sheet 3)
Figure 025



BM5 36 11 00 0 SLRJ 00

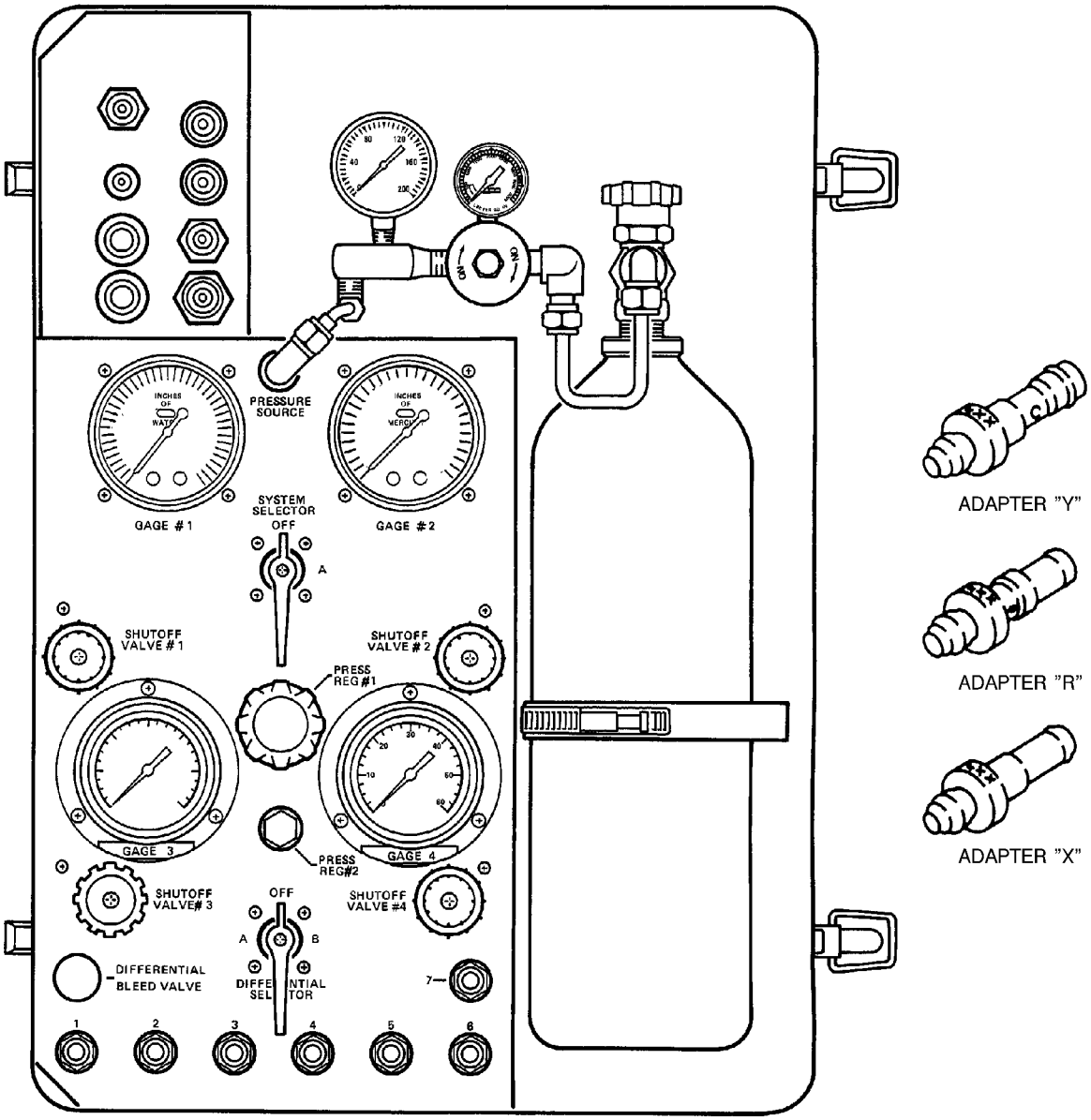
Initiated Built-in-Test Flow Diagram (Sheet 4)
Figure 025

**ON A/C 001-100,

D. In Situ Pneumatic Test
(1)General description
As a complement to the BITE, tests can be performed to check pneumatic operation of the main pneumatic components installed on aircraft, using in situ test ports provided on these components.
The tests can be performed without pressurizing the aircraft systems and removing components, but using a pneumatic tester on the ground.
(2)Tested components and functions

Component	Tested Functions	Test Ports Used on Component	Test Frequency
HP valve	- Opening at minimum pressure - Transfer (at 85 psig)	A and O 28VDC required	As required
Bleed valve	- Regulation and full opening - Reverse flow check mechanism function	B, N, C No power required	As required
Overpressure valve	- Operation (pressure at beginning of closing, and opening after full closing)	D No power required	5000 hours
Fan air valve	- Operation of relief valve	E No power required	As required

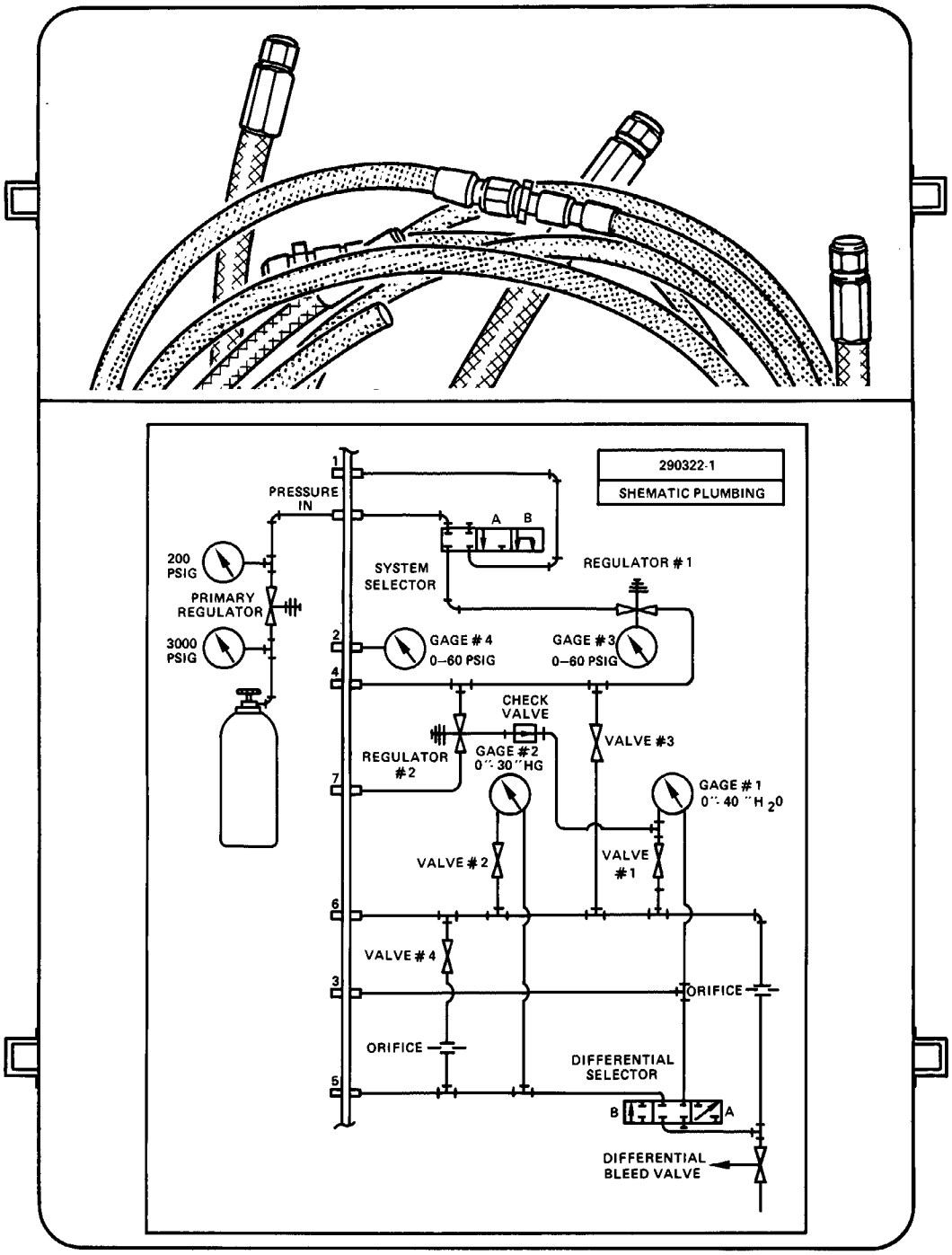
R (Ref. Fig. 026)
R (Ref. Fig. 027)



BM5 36 11 00 0 BSAA 00

Pneumatic Tester P/N 290121-4 (Sheet 1/2)
Figure 026

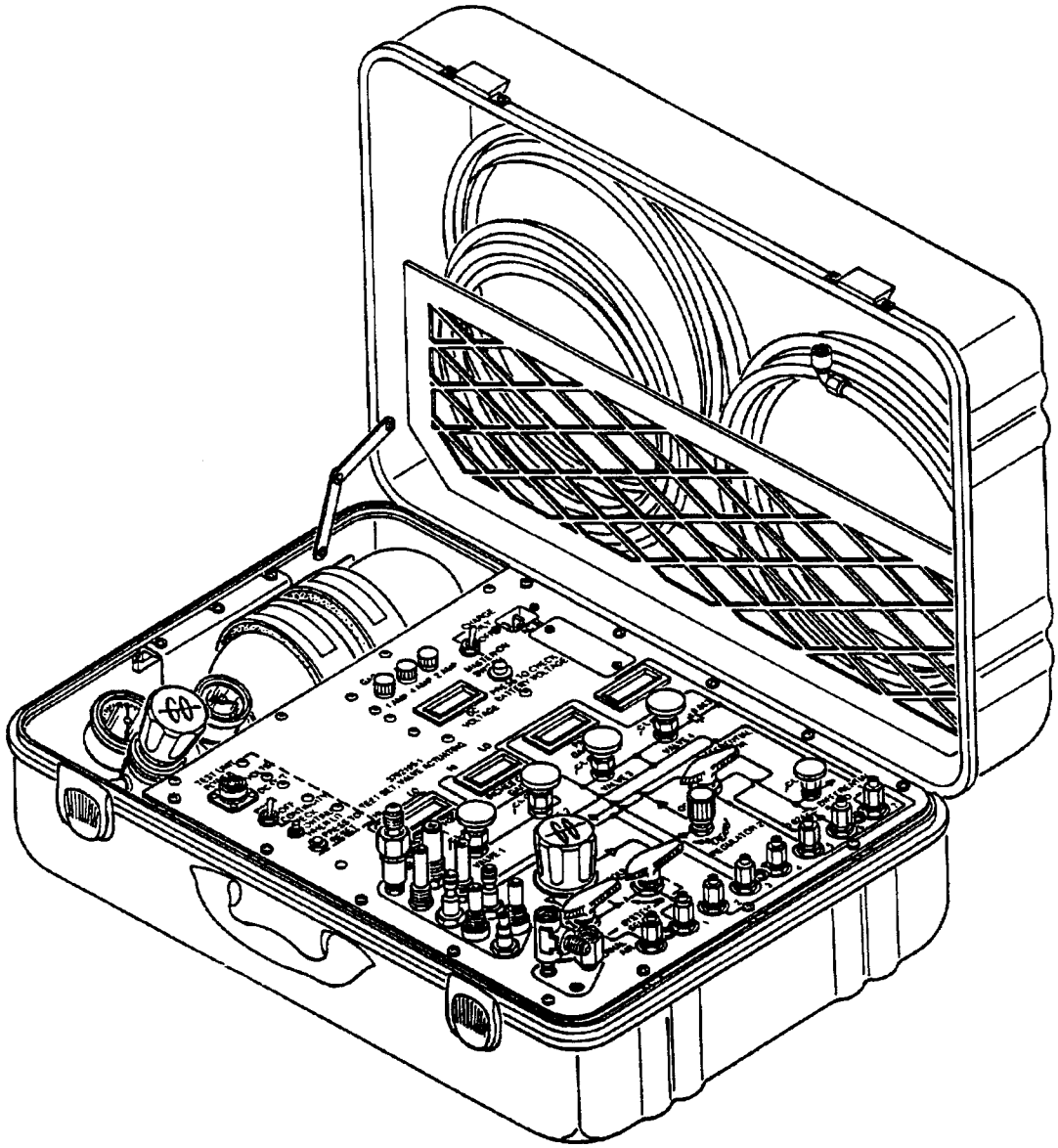
R



BM5 36 11 00 0 BSAB 00

Pneumatic Tester P/N 290121-4 (Sheet 2/2)
Figure 026

R



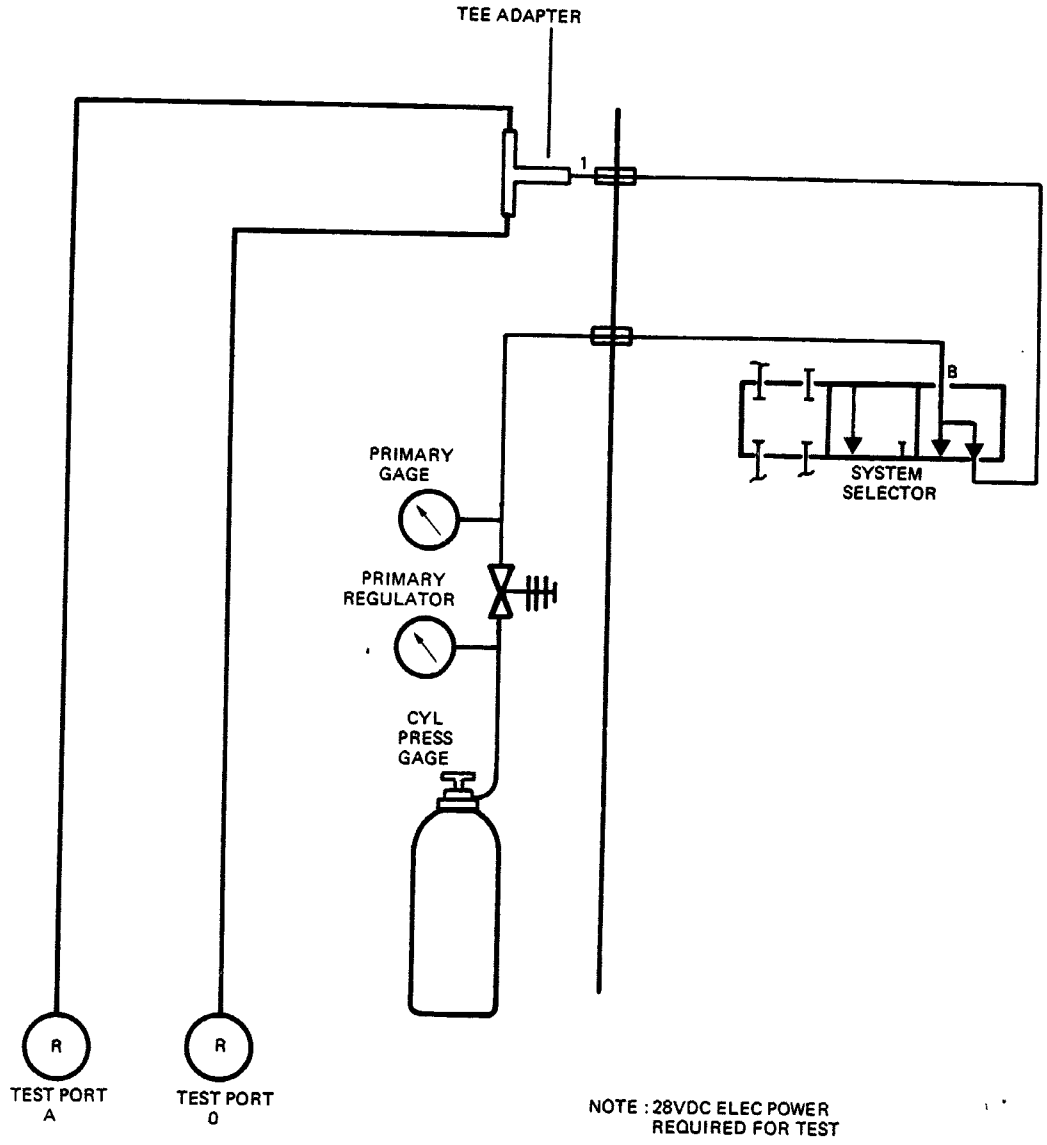
BM5 36 11 00 0 BSB0 00

Pneumatic Tester P/N 3792195-1
Figure 027

R

(3)Test devices and procedures
(a)HP valve inspection/check
Check for correct operation of HP valve low pressure switch.
CAUTION : MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.

1 Check that pneumatic supply pushbutton switches are in OFF position.
2 Place all tester controls in OFF position.
3 Fit an R adapter to test ports A and O.
4 Connect a tee adapter to tester fitting No.1 ; connect test hoses to tee adapter and to adapter R in test ports A and O.
5 Open tester cylinder shutoff valve.
R 6 Place tester SYSTEM SELECTOR in B position.
7 Place pneumatic supply pushbutton switch of system being tested in AUTO position to energize solenoid A.
R NOTE : For test set P/N 290121-4:
R - The pneumatic controller for system being tested must be ins-
R talled.
R - 28VDC electrical power on aircraft is required for test.
R NOTE : For test set P/N 3792195-1:
R - The pneumatic controller for system being tested must be ins-
R talled.
R - 28VDC electrical power on aircraft is required for test and
R is available on test set.
8 Slowly increase primary gage pressure to 10 psig by means of primary regulator while checking butterfly position indicator. Position indicator should move to full OPEN position at 10 psig.
Record primary gage pressure when position indicator is in full OPEN position.
System 1 HP valve psig
System 2 HP valve psig
9 Slowly increase primary gage pressure to 75 psig. Valve position indicator must remain in OPEN position.
10 Slowly increase primary gage pressure by means of primary regulator while checking butterfly position indicator. Valve position indicator must move to full CLOSED position at 86 ±4 psig.
Record primary gage pressure when valve position indicator moves to full CLOSED position.
System 1 HP valve psig
System 2 HP valve psig
11 Decrease primary gage pressure to zero by means of primary regulator. Valve position indicator should move to full CLOSED position.
12 Check that pneumatic supply pushbutton switch of system being tested is in OFF position.
13 Close tester cylinder shutoff valve.
14 Disconnect tester and place all controls back to OFF position.
15 Restore aircraft to normal operating condition.
(Ref. Fig. 028)



BM5 36 11 00 0 BTMO

HP Valve In Situ Test - Schematic
Figure 028

(b)Bleed valve inspection/check

Check for correct operation of bleed valve actuation and reverse flow check mechanism.

CAUTION : MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.

1 Check that pneumatic supply pushbutton switch of system being tested is in AUTO position, to de-energize bleed valve solenoid.

2 Fit an X adapter to test ports C and N and an R adapter to test port B.

3 Place all tester controls in OFF position and close all valves.

4 Connect tester : tester fitting No.4 to adapter R in test port B ; tester fitting No.5 to adapter X in test port C ; tester fitting No.6 to adapter X in test port N.

R 5 Open tester cylinder shutoff valve and place SYSTEM SELECTOR in A position.

R 6 Place DIFFERENTIAL SELECTOR in B position.

R NOTE : Make certain that the DIFFERENTIAL BLEED VALVE is closed.

7 Slowly increase primary gage pressure to 60 psig by means of primary regulator.

8 Open shutoff valves No.2 and No.3.

9 Slowly increase gage No.3 pressure to 30 psig, valve position indicator should remain in CLOSED position.

R 10 Slowly open DIFFERENTIAL BLEED VALVE while checking the valve position indicator. Valve position indicator should move to full OPEN position by one inch of mercury (1 Hg) as indicated on gage No.2.
Record gage No.2 reading when valve position indicator moves to full OPEN position.
System 1 bleed valve Hg.
System 2 bleed valve Hg.

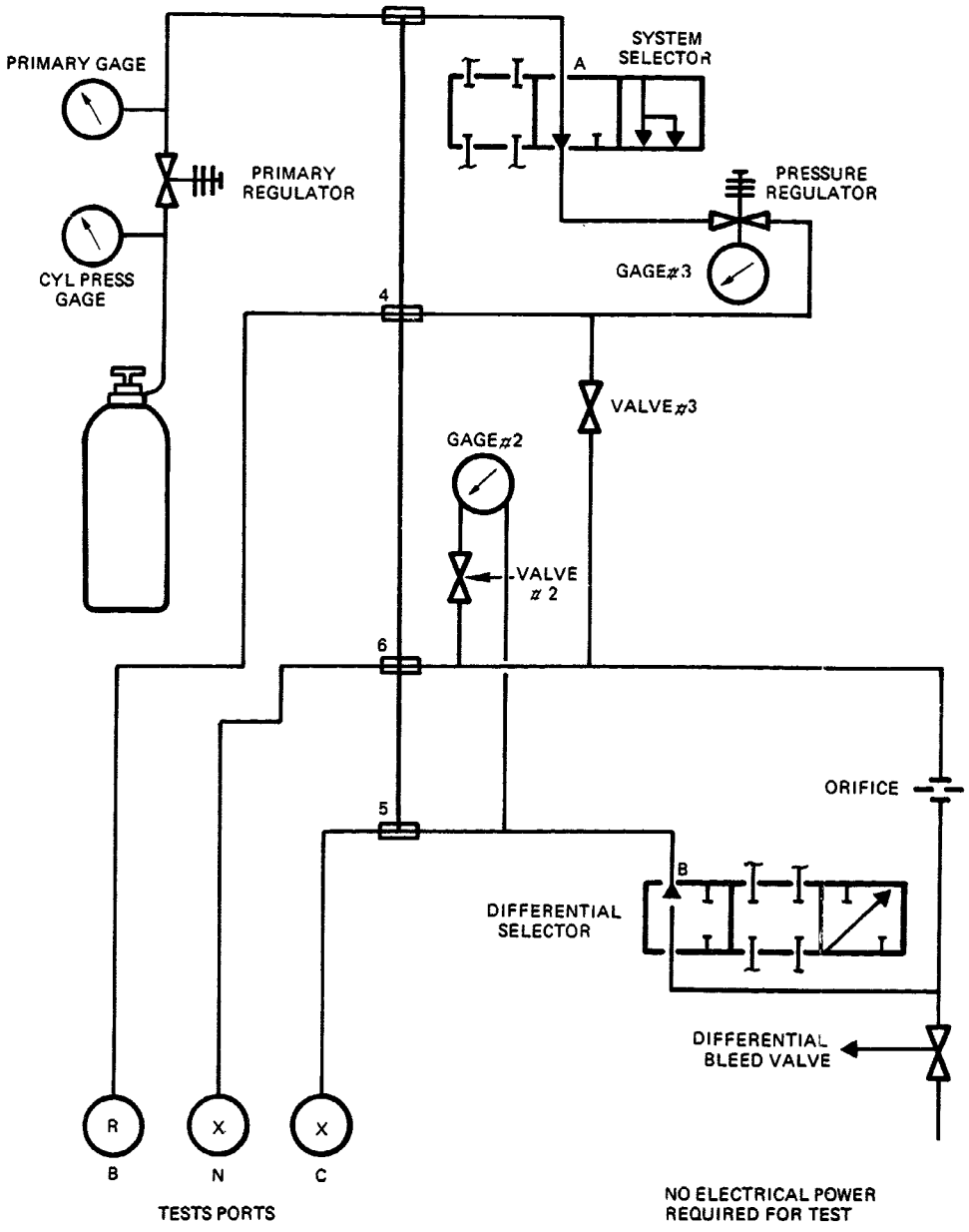
R 11 Close DIFFERENTIAL BLEED VALVE, position indicator should move to full CLOSED position.

12 Decrease gage No.3 pressure to zero by means of the pressure regulator, and primary gage pressure to zero by means of the primary regulator.

13 Close tester cylinder shutoff valve.

14 Disconnect tester and place all tester controls back to OFF position.

15 Restore aircraft to normal operating condition.
(Ref. Fig. 029)



BM5 36 11 00 0 BVMO

Bleed Valve In Situ Test-Schematic
Figure 029

(c)Fan Air Valve - Inspection/Check

Check for correct operation of the supply pressure relief valve of the fan air valve.

1 Open pneumatic system control circuit breaker located on the main circuit breaker panel for system being tested.

2 Fit adapter X to test port E.

3 Open tester cylinder shutoff valve.

R 4 Place tester **SYSTEM SELECTOR** in **B** position.

5 Slowly increase primary gage pressure while checking valve butterfly position indicator. Position indicator should move to full **OPEN** position at 20 psig.

6 Disconnect vent line from relief valve.

7 Increase tester primary gage pressure until relief valve opens. Relief valve should open at 190 psig, as indicated on the primary gage.

NOTE : Aurally check that air is escaping from valve.

Record primary gage reading when relief valve opens.

System 1 fan air valve psig.

System 2 fan air valve psig.

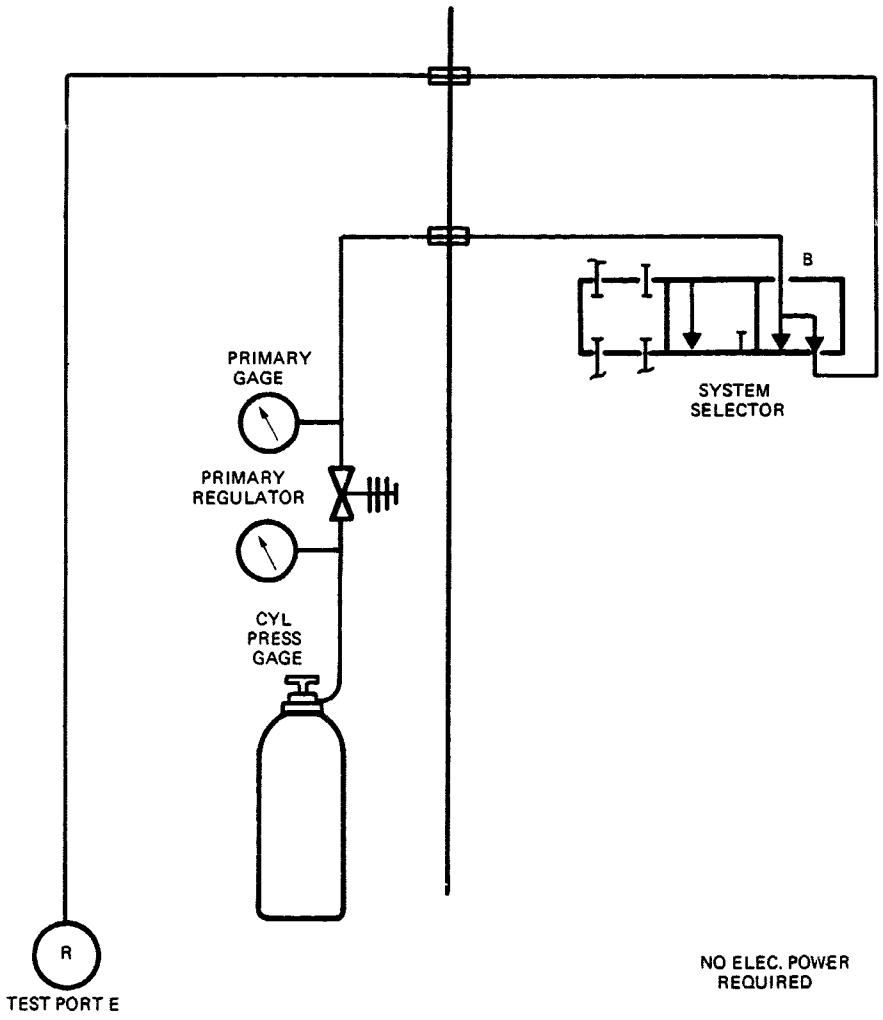
8 Decrease tester primary gage pressure to zero.

9 Connect vent line to relief valve.

10 Close tester cylinder shutoff valve.

11 Restore aircraft to normal operating condition.

(Ref. Fig. 030)

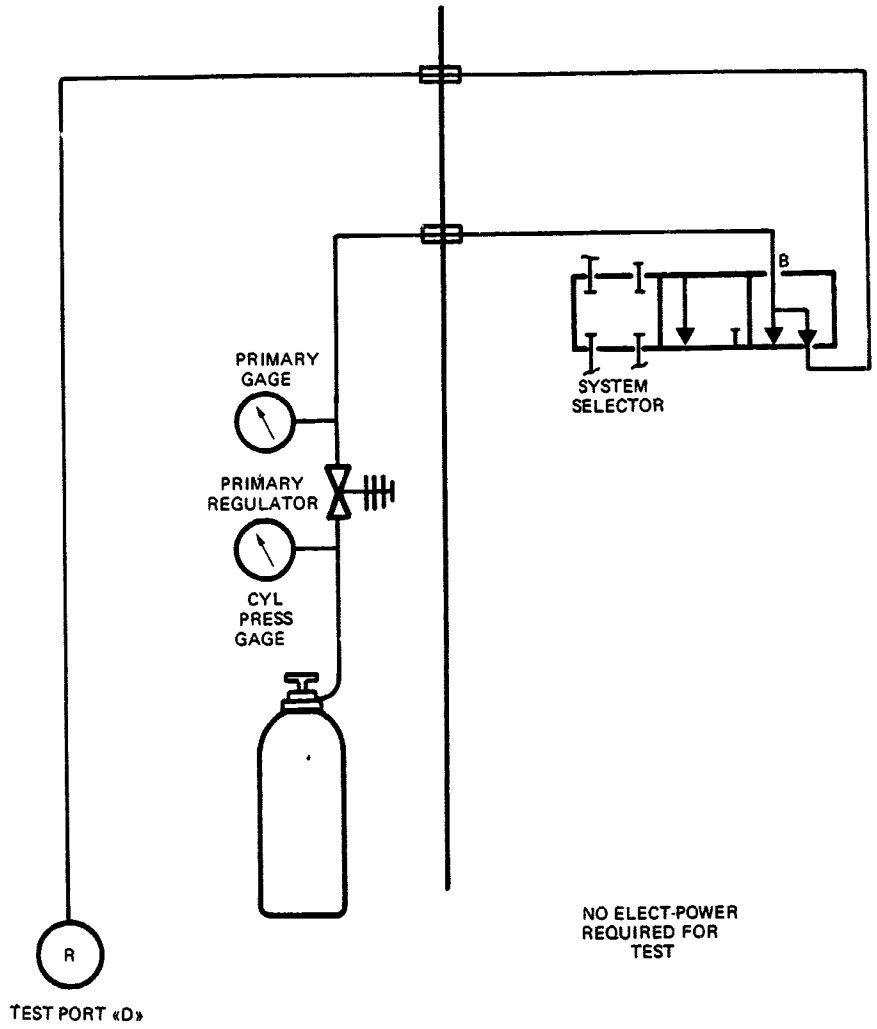


BM5 36 11 00 0 BXMO

Fan Air Valve In Situ Test-Schematic
Figure 030

(d)Overpressure valve inspection/check
Check for correct operation of overpressure valve.
CAUTION : MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.

1 Place all tester controls in OFF position.
2 Remove plug from test port D.
3 Fit adapter R to test port D.
4 Connect tester : tester No.1 to adapter R in test port D.
R 5 Place SYSTEM SELECTOR in B position.
6 Slowly increase primary regulator gage pressure to 45 psig by means of primary regulator while checking butterfly position indicator. Butterfly should remain open.
7 Slowly increase primary regulator gage pressure until butterfly position indicator moves to full CLOSED position.
NOTE : Butterfly position indicator should begin to move to the CLOSED position at not less than 74 psig and shall be fully CLOSED at not more than 90 psig.
- Record primary gage reading when valve butterfly position indicator starts to close.
System 1 overpressure valve psig.
System 2 overpressure valve psig.
- Record primary gage reading when valve butterfly position indicator is in full CLOSED position.
System 1 overpressure valve psig.
System 2 overpressure valve psig.
8 Slowly decrease primary gage pressure while checking butterfly position indicator. The indicator should move to full OPEN position at not less than 40 psig.
Record primary gage reading when valve butterfly position indicator moves to full OPEN position.
System 1 overpressure valve psig.
System 2 overpressure valve psig.
9 Decrease primary gage pressure to zero.
10 Disconnect tester and place all controls back to OFF position.
11 Restore aircraft to normal operating condition.
(Ref. Fig. 031)



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Overpressure Valve In Situ Test-Schematic
Figure 031

ENGINE BLEED AIR SUPPLY SYSTEM - DUCTING - REMOVAL/INSTALLATION

1. Reason for the Job

A. Removal/installation of a duct or section of ducting in the wings.

B. Replacement in removed ducting of a duct, an O-ring or a flexible connector.

C. Removal/installation of bleed air precooler cold air inlet duct.

D. Removal/installation of wing-to-pylon connections.

E. Removal/installation of wing-to-fuselage feedthrough ducting.

F. Removal/installation of engine bleed air ducting.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT SYSTEM IS DEPRESSURIZED.

DISPLAY WARNING NOTICES PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.

DISPLAY WARNING NOTICES PROHIBITING ENGINE START-UP.

PLACE FLAP AND SLAT CONTROL LEVER IN FIRST NOTCH POSITION AND DISPLAY WARNING NOTICES PROHIBITING ITS OPERATION.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m to 4.5 m (8 ft. to 14 ft.)
B.	Torque Wrench 0 to 1.5 m.daN (0 to 130 lbf.in)
C.	Tab Washers
D.	Blanking Plugs/Caps
E.	Protective Covers
F.	Warning Notices
G. Material No. 04-007	Common Greases (Ref. 20-31-00)
H. Material No. 19-001	Wire, SS, Braided (Ref. 20-31-00)
J. 98A21003002000	Handle - Duct Extractor
Referenced Procedures	
R - 20-26-00, P. Block 1	Installation of Expansion Joints
- 36-11-00, P. Block 601	Engine Bleed Air Supply System
- 36-11-15, P. Block 401	Bleed Air Precooler
- 36-22-12, P. Block 401	Overheat Sensing Element
- 36-12-00, P. Block 401	APU Bleed Air Supply and Crossbleed Systems
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)

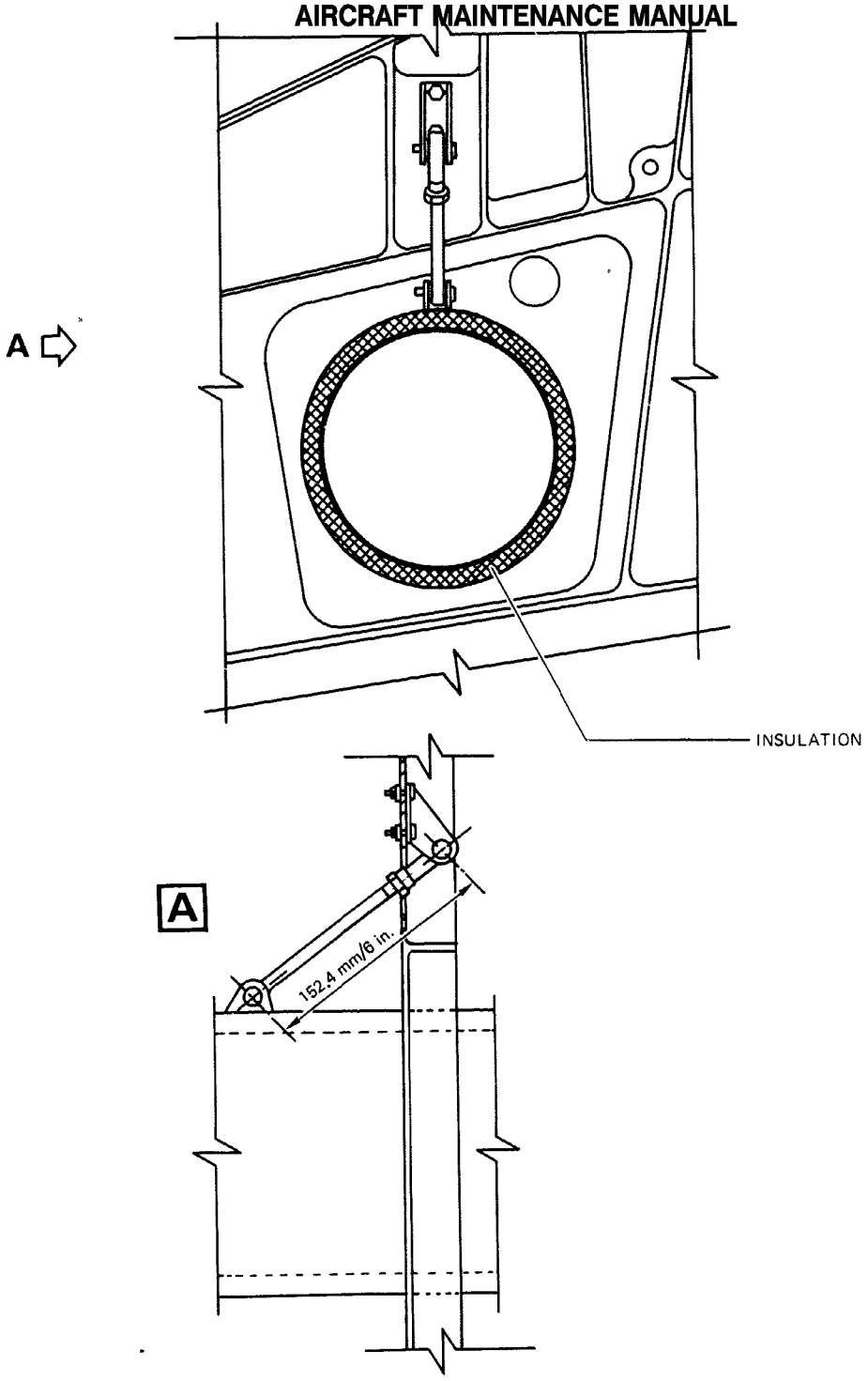
3. Removal/Installation of a Duct or Section of Ducting in the Wings
(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)
NOTE : The HP air bleed ducts are interconnected :
- by clamps
- by flexible connectors.
This paragraph details typical removal/installation procedures for the components of the pneumatic system.
Removal of a duct connected at one or both ends by a flexible connector entails removal of ducting as far as the next clamp connection either at one side or at both sides of the duct.

To facilitate removal of ducts located in the wings, particularily of those routed through ribs, a duct upstream or downstream of the duct concerned, or if possible a duct located between two ribs, must first be removed.

A. Job Set-Up
(1)Position access platform.
(2)Open access doors 512AB to 523BB (612AB to 623BB).

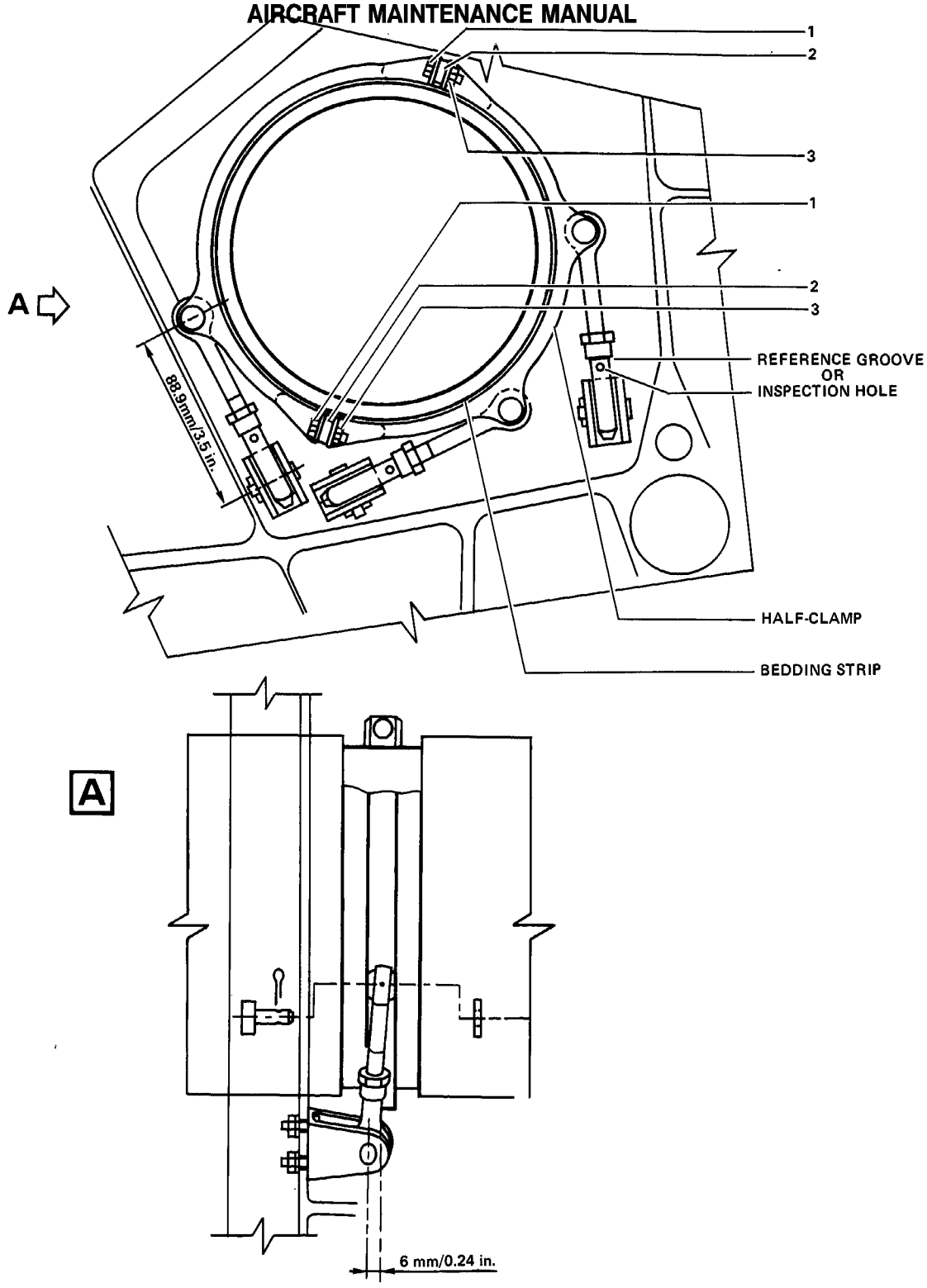
B. Removal
(1)Remove overheat sensing element (Ref. 36-22-12, P. Block 401).
NOTE : Take care not to damage sensing elements during work procedures.
(2)When necessary, remove cradles, shields and one or several wing ice protection supply lines.
(3)Disconnect any duct attachment fittings : brace links or structural support fittings, bonding strips.
(4)When necessary disconnect and cap associated pneumatic supply lines.
(5)When necessary remove deflectors and insulation muffs.
(6)Remove, when installed nuts (3), bolts (1), washers (2) and the two retaining half clamps and the bedding strip and retain for installation.
(7)Remove clamps connecting the duct or section of ducting and remove duct or ducting. Cap all open duct ends.

C. Replacement in Removed Ducting of a Duct, O-Ring or Flexible Connector
(1)Disassembly of flexible connector
R (Ref. Fig. 404)
R (a)Remove insulation muff (7).
R (b)Unlock and loosen locknut (6).
R (c)When necessary, disconnect bonding strip (1).
R (d)Remove bolt (2), nut (3) and washers (4) assemblies and remove links (5).
R (e)Separate male and female halves of connector.
R (f)Remove and discard seals (8).
R NOTE : Take care not to damage seal retaining grooves.
R (2)Assembly of flexible connector
R (a)Clean and inspect both halves of connector ; in particular seal bearing surfaces on male half which must be completely smooth.
R (b)Install seal(s) (8) in retaining grooves according to seal type



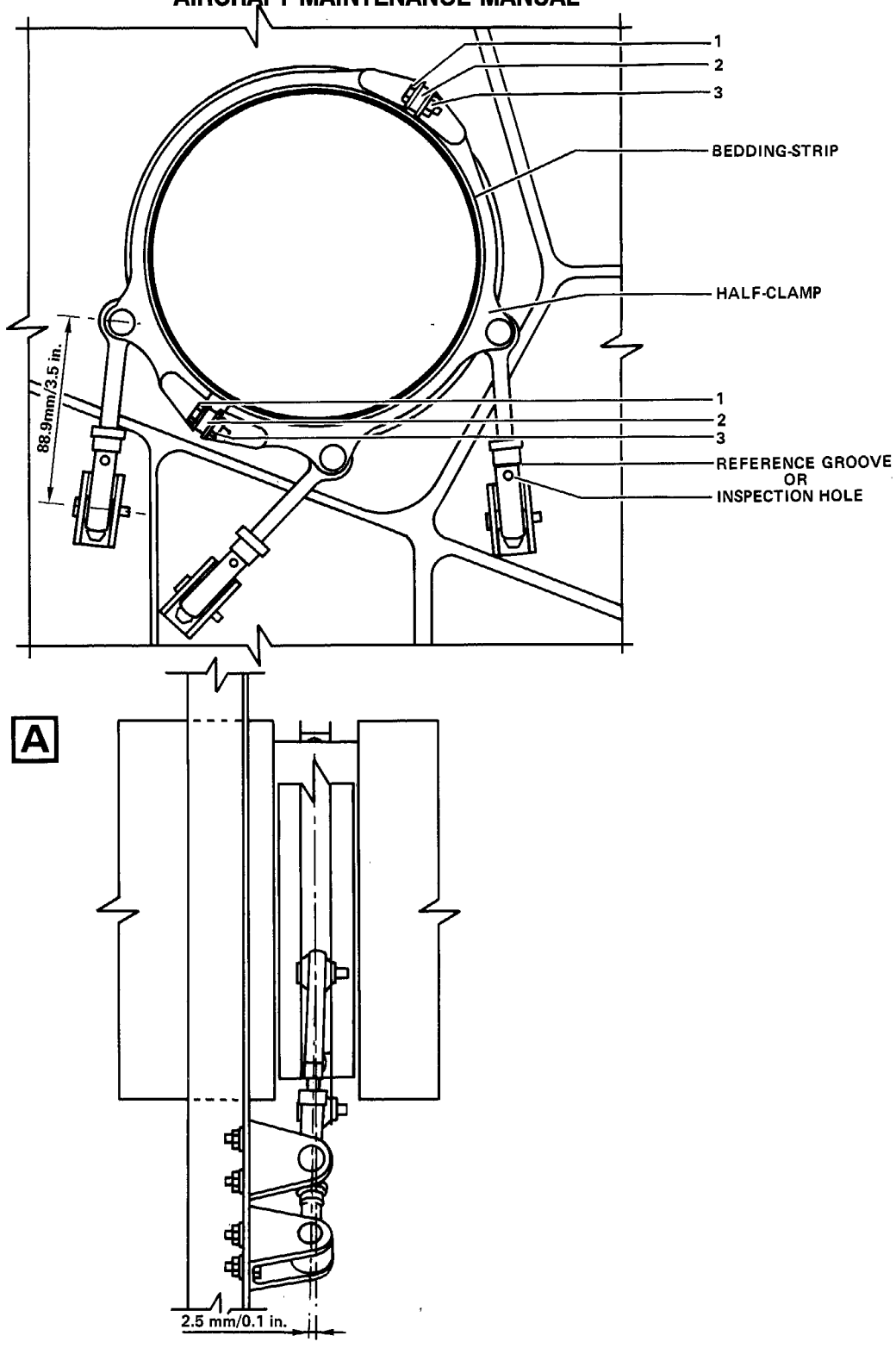
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Attachment of Ducting STA67/RIB2
Figure 401



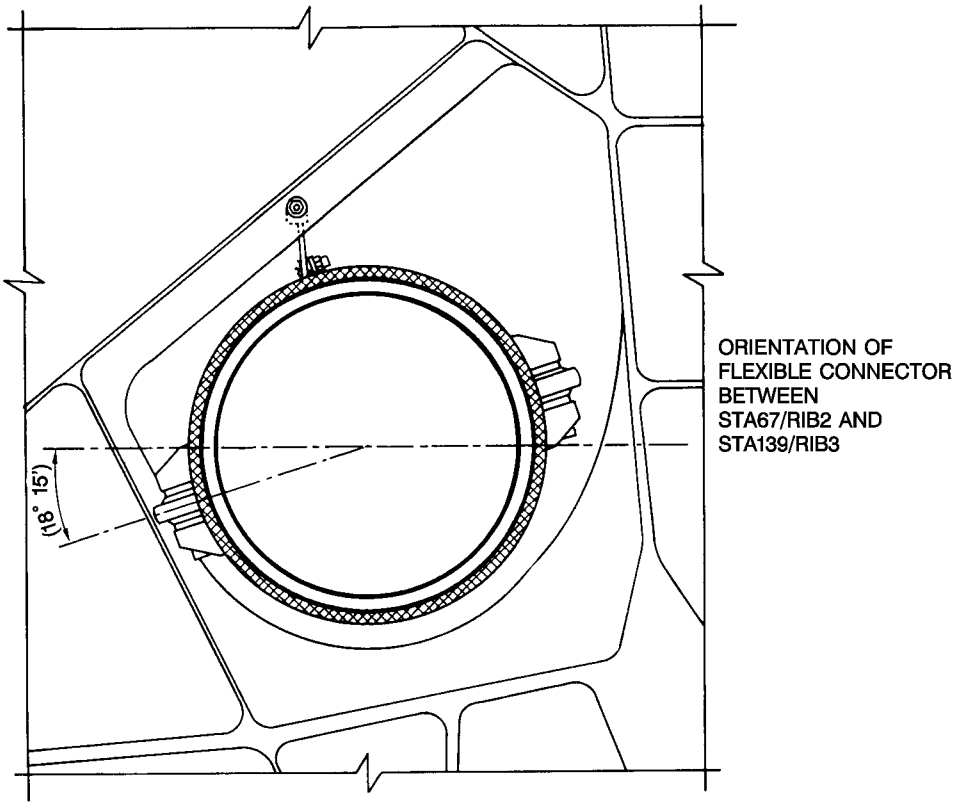
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Attachment of Ducting STA139/RIB3
Figure 402



BM5 36 11 00 4 APMO - 18 - 13
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Attachment of Ducting STA339/RIB6
Figure 403



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Flexible Connector - Typical Installation and Adjustment
Figure 404

R

(Ref. 20-26-00, P. Block 1).

(c)Mate male and female halves of connectors, using a rotating movement with one half to avoid damaging seal.

(d)Align terminals of bonding strip (1).

(e)Install links (5) using bolt (2), nut (3) and washers (4) assemblies ; observe nominal dimension of 127.5 ±7 mm (5.02 ±0.275 in.). Tighten and safety locknut (6) on link (5).

NOTE : - Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies.

NOTE : - Make certain that duct flanges are parallel so as to ensure no angulation (a tolerance of ±2 mm (± 0.08 in.) throughout the whole circumference of the duct is accepted) (Ref. Fig. 404).

(f)Connect bonding strip (1), if necessary.

(g)Install insulation muff (7) :

- For Velcro type, secure muff by pressing velcro strip together.
- For Lace-up type, lace-up with Material No. 19-001.

D. Installation

(1)Remove all caps and protective covers.

(2)Check condition of duct flanges ; cleanliness, scoring. cracks or deformation.
(Ref. Fig. 405)

(3)Install bedding strip and the two half clamps. Install bolts (1), washers (2) and nuts (3) ; do not tighten at this stage to allow for correct positioning.

NOTE : Washers are installed between the two contact surfaces of the half clamps to enable correct tightening.

(4)Install duct or ducting ; remove bolts from flexible connector links where necessary to facilitate installation.

(5)Check that clamps are clean and in correct condition.

(6)Check that flanges mate with no undue stress ; slide open clamp over flanges and install tee bolt in trunnion.

(7)Connect any attaching items (brace links, structural support fittings).

(8)Position half clamps so as to allow installation of links and tighten bolt (1) and nut (3) assembly. Adjust thickness of washers (2) so that duct is held firmly without being crushed.

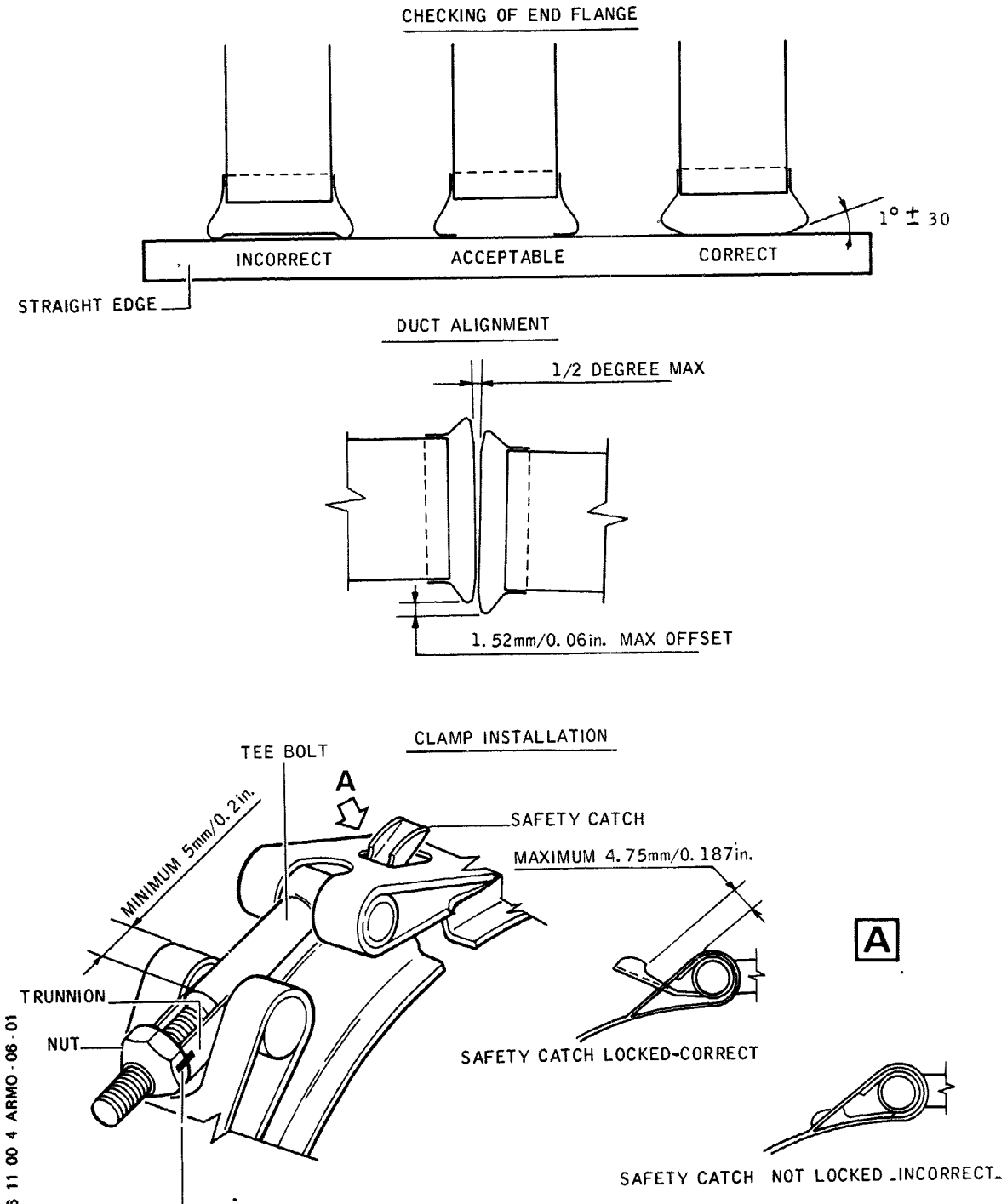
NOTE : Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies. If link adjustment was performed, replace tab washers and safety locknuts.

(Ref. Fig. 402, 403)

R NOTE : - Check that attaching parts do not cause misalignment of ducts
R greater than 0.5 deg.
R (offset must not exceed 1.52 mm (0.06 in.)).
R - Check that the duct flanges of the male and female halves of
R the flexible connector are parallel (Ref. Fig. 404).

R (9)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.

R (10)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.



Clamp Installation and Duct Alignment
Figure 405

R NOTE : For clamps comprising a safety catch, check that when locked, the
R gap between catch and top surface of clamp does not exceed 4.75 mm
R (0.187 in.) (Ref. Fig. 405).
R Check that non-threaded part of tee bolt engages in trunnion
R by more than 5 mm (0.2 in.) (Ref. Fig. 405).
R If either of these conditions is not met, discard clamp.
R NOTE : To indicate that the clamps or couplings have been correctly
R torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx.
R can be applied to the nut and trunnion or bolt ; if necessary,
R remove the existing mark.
R (11)Connect any previously removed associated pneumatic supply lines.
R (12)On flexible connectors, check that on-center-distance between link attach
R fittings is 127.5 ±7 mm (5.02 ±0.275 in.). (Ref. Fig. 404) Adjust
R links (5) if necessary and safety link eyebolt locknut, making certain
R that eyebolt threads are visible through inspection hole or reference
R groove is inside link body.
R NOTE : The distance between link attach fittings must be the same for
R both sides.
(13)Connect any previously removed bonding strips.
(14)Install previously removed ambient overheat sensing elements.
(Ref. 36-22-12, P. Block 401).
(15)Install previously removed deflectors and insulation muffs :
- For Velcro type, secure muffs by pressing velcro strip together.
- For Lace-up type, lace-up muffs with Material No. 19-001.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscel-
laneous items of equipment.
(2)Close access doors 512AB to 523BB (612AB to 623BB).
(3)Remove access platform.

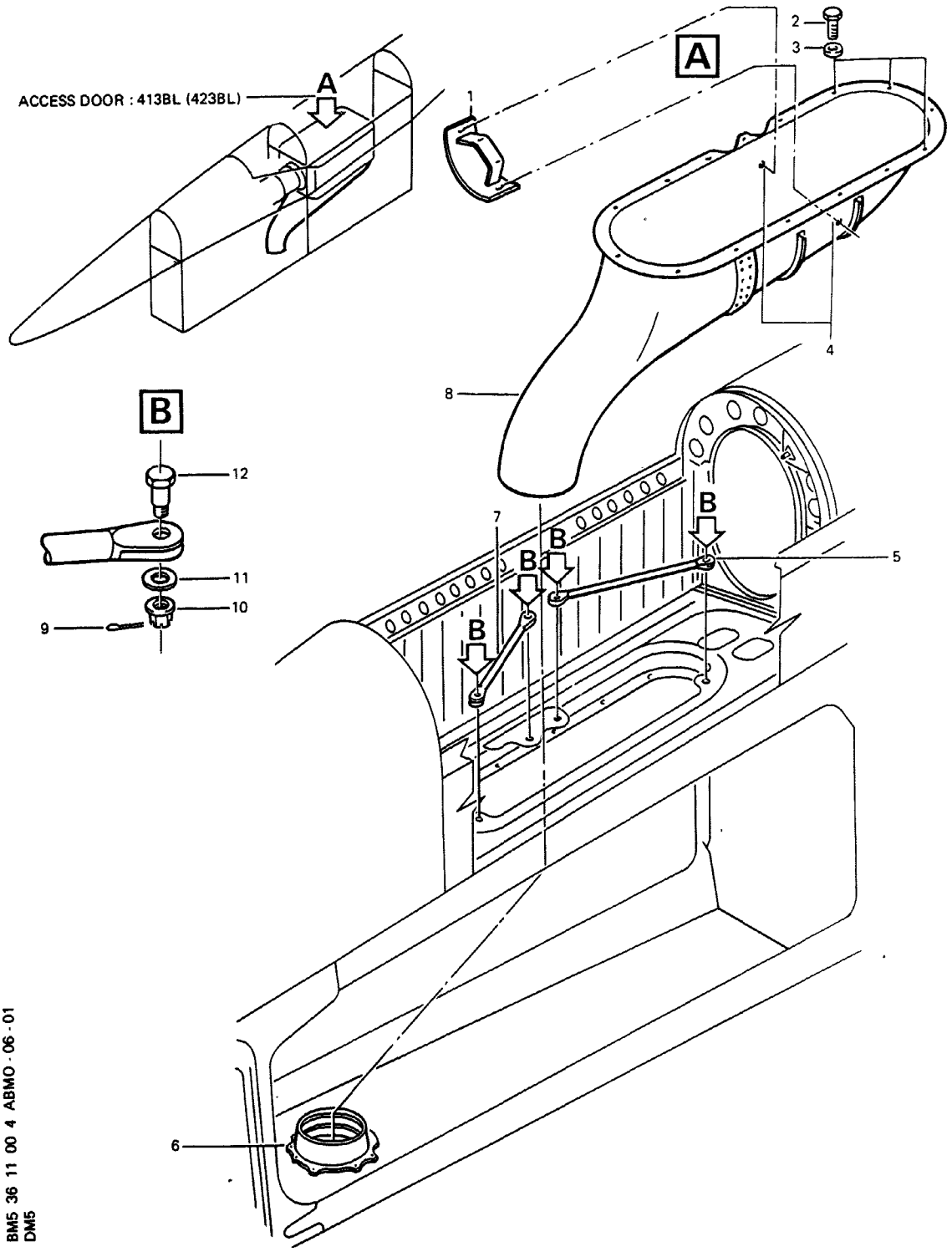
4. Removal/Installation of Bleed Air Precooler Cold Air Inlet Duct
(Ref. Fig. 406)

A. Job Set-Up
(1)Remove bleed air precooler (Ref. 36-11-15, P. Block 401).

B. Removal
NOTE : Place blanking plug in inlet duct to prevent tools or items of equipment from falling inside during removal procedures.
(1)Remove cotter pins (9), nuts (10), washers (11) and bolts (12) and remove rods (5) and (7).
(2)Remove screws (2) and washers (3) securing duct (8).
(3)Install extractor (1) on duct by means of captive nuts (4).
(4)Ease out duct (8) from sleeve (6) and remove duct.
(5)Install blanking cap on sleeve (6)

C. Installation
(1)Clean and inspect duct interface and/or adjacent area.
(2)Install extractor handle (1) on duct (8).
(3)Remove blanking cap from sleeve (6).
(4)Install blanking plug in duct (8) to prevent tools or items of equipment from falling inside the duct.
(5)Install duct (8) and check that if fits correctly in sleeve (6).
(6)Install screws (2) and washers (3) attaching duct to structure.
(7)Remove extractor handle (1).
(8)Install rods (5) and (7) and secure with screws (12), washers (11) and nuts (10).
(9)Install cotter pins (9).
(10)Remove blanking plug from duct (8).
(11)Install precooler (Ref. 36-11-15, P. Block 401).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



Air Inlet Duct
Figure 406

5. Removal/Installation of Wing-to-Pylon Connections

R (Ref. Fig. 407)

A. Job Set-Up

(1)Display relevant warning notices.
(2)Position access platform at access doors 472AR (482AR) and 471AL (481AL).
(3)Open access door 472AR (482AR).
(4)Open access door 471AL (481AL).

R B. Removal

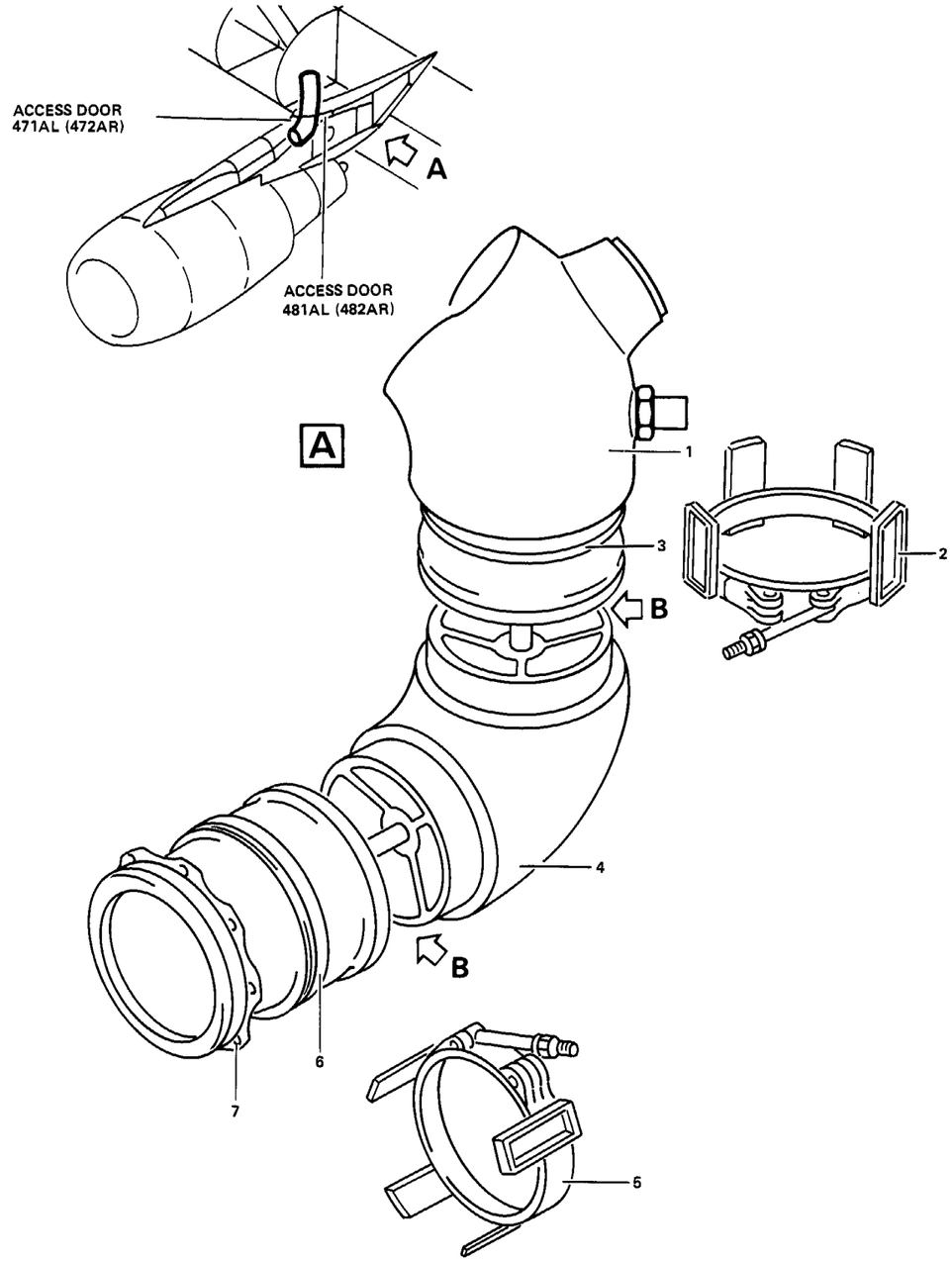
R (1)Unlace and remove insulation muffs.
R (2)Remove the two clamps (2) and (5).
R (3)Slide sleeves (3) and (6) into the upper and lower ducts (1) and (7) respectively to gain access to the internal turnbuckle assembly.
R (4)On the internal turnbuckle assembly :
R - Unlock and loosen locking system : locknut (20) and tabwasher (21).
R - Separate spherical head rods (24) from threaded sleeves (22).
R - Discard tab washers (21).
R (5)Remove elbow duct (4) and cap all open duct ends.
R (6)Remove and check condition of sleeves (3) and (6).
R (7)Remove and discard seal(s).
R NOTE : Take care not to damage seal retaining grooves.

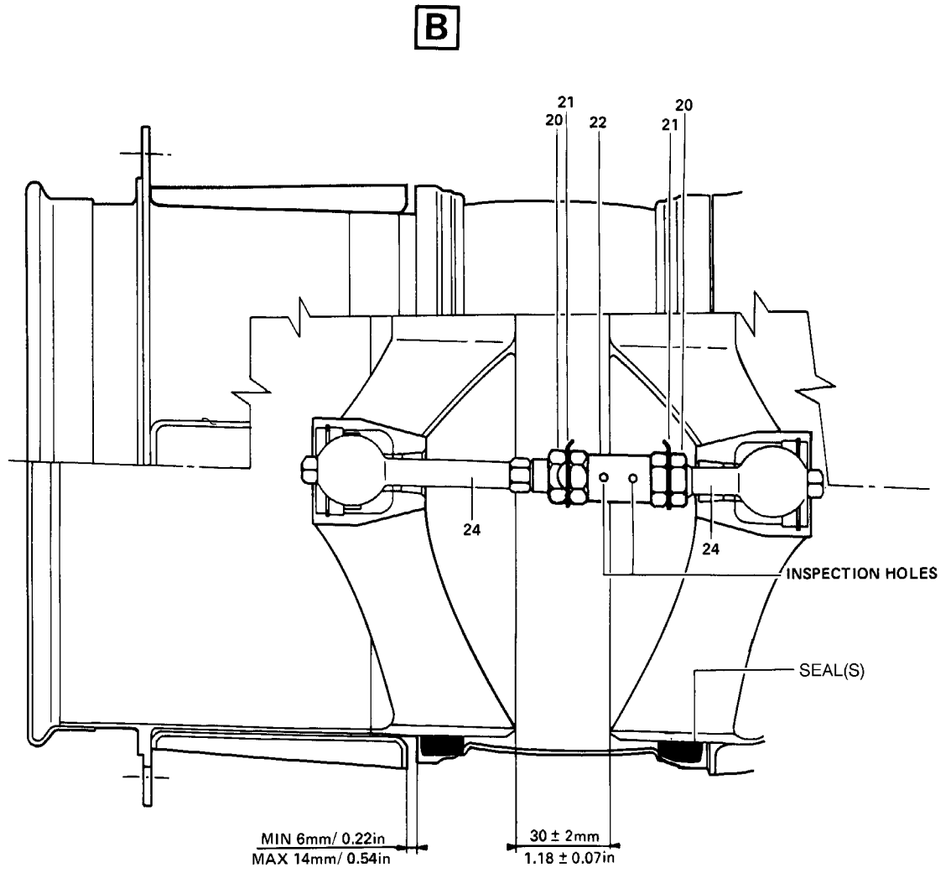
R C. Installation

R (1)Remove all blanking plugs/caps.
R (2)Check condition and clean duct ends, especially O-ring mating surfaces.
R (3)Install seal(s) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1) (Ref. Fig. 407).
R (4)Install sleeves (3) and (6) on ducts (1) and (7).
R (5)Install elbow duct (4) between ducts (1) and (7).
R (6)Connect turnbuckle assembly :
R - Adjust spherical head rods (24) on threaded sleeves (22) to achieve a gap of 30 ±2 mm (1.18 ± 0.07 in.) between ducts.
R NOTE : Make certain that threads ends are visible through inspection holes or reference grooves are inside link bodies.
R (7)Tighten and safety locknuts (20) by bending washer tabs (21).
R (8)Slide sleeves (3) and (6) to come into contact with elbow ends.
R (9)Install lower clamps (5) to come into contact with bottom flange and upper clamp (2) to come into contact with top shoulder.
R (10)Check distance between clamp (5) hollow - pads and sleeve (6) flange. This should be between 6 and 14 mm (0.22 and 0.54 in.) (Ref. Fig. 407).
R (11)Install insulation muffs and lace up with Material No. 19-001.

D. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors 472AR (482AR) and 471AL (481AL).
(3)Remove access platform.
(4)Remove warning notices.





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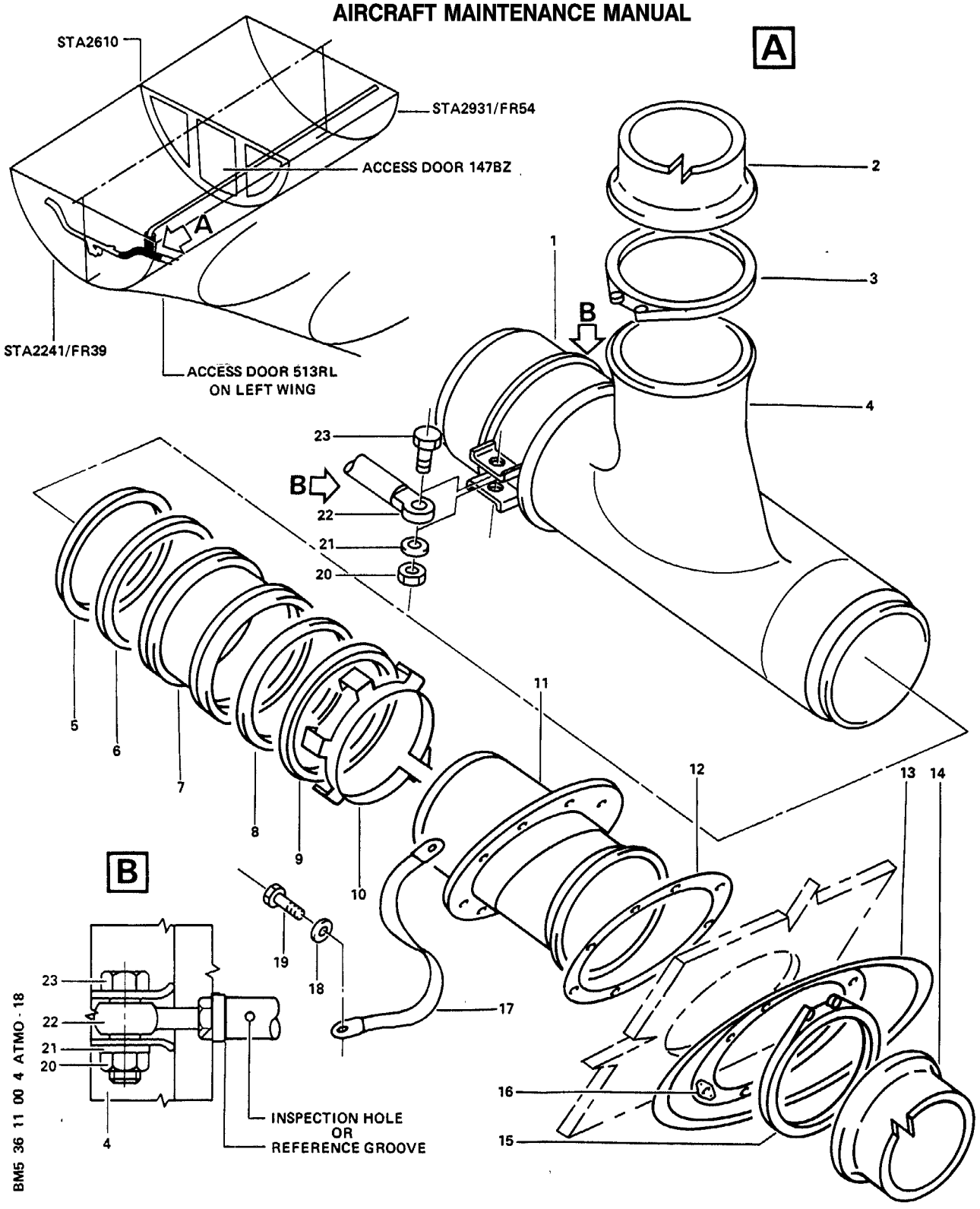
Detail of Wing-to-Pylon Connection
Figure 407

R

6. Removal/Installation of Wing-to-Fuselage Feedthrough Ducting

A. Removal/Installation of Left Feedthrough.
(Ref. Fig. 408)

R (1)Job set-up
R (a)Display relevant warning notices.
R (b)Position access platform beside access door 513RL at wing/fuselage feedthrough, left side.
R (c)Open access door 513RL.
R (d)Open main gear doors (Ref. 32-12-11, P. Block 301).
R (e)Remove air conditioning compartment access door 147BZ.
R (2)Removal
R (a)Remove overheat sensing elements when necessary (Ref. 36-22-12, P. Block 401).
R NOTE : If removal of sensing element is not required, take care not to damage element during work procedures.
R (b)On the wing side, remove clamp (15).
R (c)Loosen lock screw of clamp (10) to be able to slide coupling housing (7).
R (d)Remove bolts (23), washers (21) and nuts (20) and disconnect links (22) on tee duct (4) side.
R (e)Hold protective casing (13) on wing side and remove the 8 attachment screws (19) and washers (18) ; note location of screw securing bonding strip.
R (f)Hold tee duct (4) and remove clamp (3).
R (g)Slide tee duct (4) in order to free feedthrough (11) and pressure seal (12).
R (h)Free feedthrough (11) and pressure seal (12).
R (j)Install clamp (3) to hold tee duct (4) in position, but do not tighten at this stage.
R (k)Remove coupling housing (7).
R (l)Remove and discard seals (5), (6), (8) and (9).
R NOTE : Take care not to damage seal retaining grooves.
R (m)Cap open duct ends on tee duct (4).
R (n)Cap open ends of duct (14) in wing.
R (3)Installation
R (a)Install seals (5), (6), (8) and (9) in retaining grooves on housing (7) according to seal type (Ref. 20-26-00, P. Block 1).
R (b)Remove blanking cap from tee duct (4) and install housing (7).
R (c)Check condition of pressure seal (12) and discard if necessary.
R (d)Check condition of feedthrough.
R 1 Check for correct condition of flange (Ref. Fig. 405).
R 2 Check that seal contact surfaces are smooth and free from scoring.
R 3 Check for absence of cracks or signs of fracture around attachment flange.
R 4 Check condition of captive nuts (16).
R (e)Remove blanking plugs/caps from duct (14).
R (f)Hold tee duct (4) and remove clamp (3).
R (g)Insert feedthrough (11) in housing by sliding (7) and (4) and position pressure seal (12) correctly. Install clamp (3) but do not tighten at this stage.



Wing-to-Fuselage Feedthrough - Left Side
Figure 408

(h)Install protective casing (13) on feedthrough (11) and install clamp (15) but do not tighten at this stage.
(j)Install links (22) and secure with bolts (23), washers (21) and nuts (20).
NOTE : Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies.
(k)Install attachment screws (19) and washers (18) securing feedthrough (11) to protective casing (13), but do not tighten at this stage.
(l)Correctly position all items already installed. Tighten and safety the 8 screws (19) securing feedthrough to protective casing (13). Connect bonding strip (17) at location noted during removal.
(m)TORQUE clamp (15) to value given on clamp.
(n)Make certain that no tool or item of equipment has been left in wing. Close access door 513RL.
(p)TORQUE clamp (3) to value given on clamp.
(q)Correctly position coupling housing (7) and tighten lockscrew (10) of retaining clamp.
(r)Install any sensing elements previously removed (Ref. 36-22-12, P. Block 401).

(4)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (b)Install access door.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE
R CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE
R THE ACCESS DOORS/PANELS AT FR47.
R 1 Install air conditioning compartment access door 147BZ.
(c)Close main gear doors (Ref. 32-12-11, P. Block 301).
(d)Remove access platform.
(e)Remove warning notices.

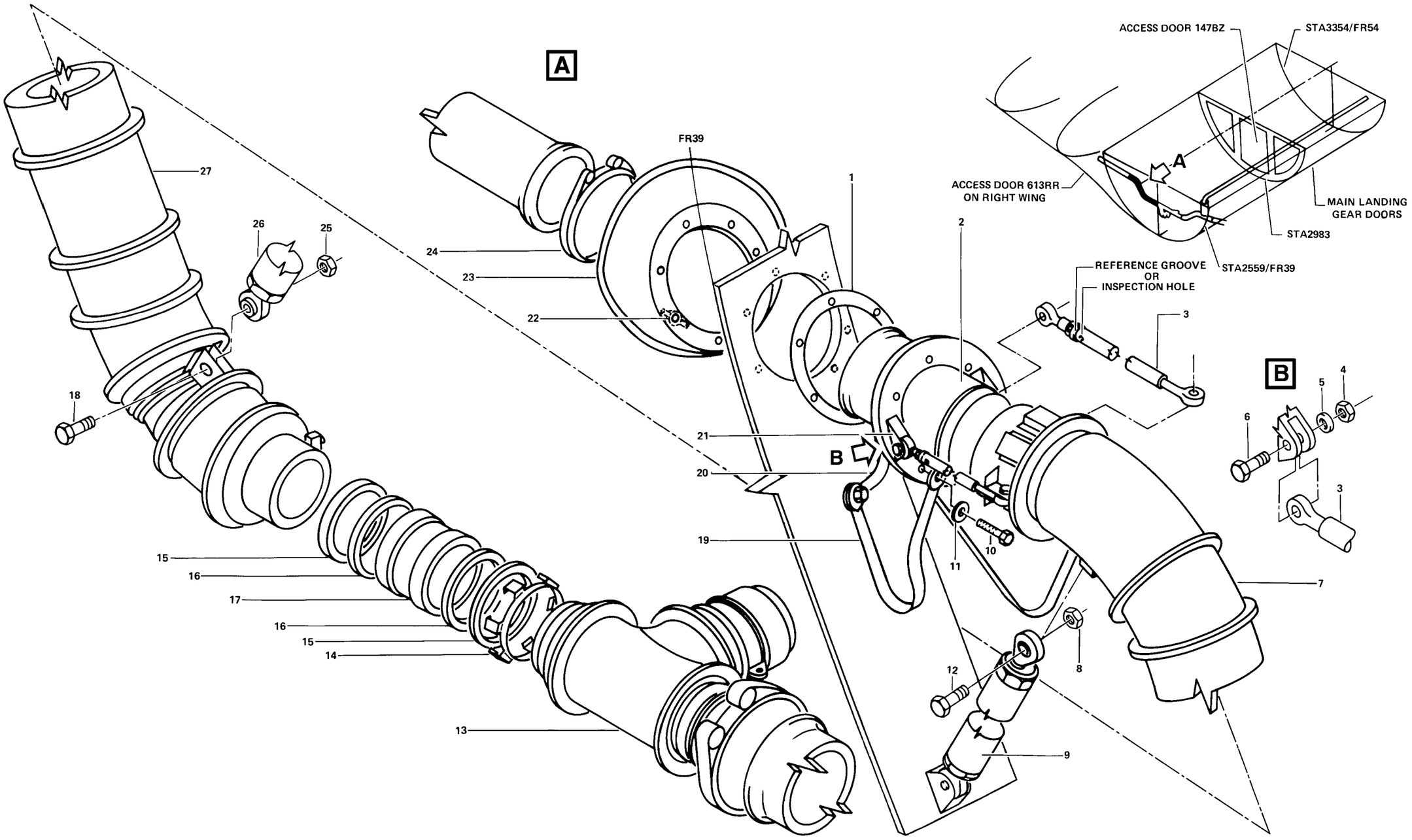
B. Removal/Installation of Right Feedthrough
(Ref. Fig. 409)

(1)Job set-up
(a)Display relevant warning notices.
(b)Position access platform beside access door 613RR at wing-to-fuselage feedthrough, right side.
(c)Open access door 613RR.
(d)Open main gear doors (Ref. 32-12-11, P. Block 301).
(e)Remove air conditioning compartment access door 147BZ.

(2)Removal
(a)Remove overheat sensing elements when necessary (Ref. 36-22-12, P. Block 401).
NOTE : If removal of sensing element is not required, take care not to damage element during work procedures.
(b)Remove tee duct (13) next to crossfeed valve (Ref. 36-12-00, P. Block 401) to gain access to item to be removed.
(c)Remove coupling housing (17).
(d)Remove and discard seal(s) (15) and (16).
NOTE : Take care not to damage seal retaining grooves.
(e)Remove nuts (4), washers (5) and bolts (6) and remove links (3) from

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Wing-to-Fuselage Feedthrough - Right Side
Figure 409

R

support fittings (21).
(f)Remove bonding strips (19) and (20), duct side.
(g)Hold duct (27) and remove nut (8), bolt (12) and remove link (9) on duct side.
(h)Remove nut (25), bolt (18), link (26) on duct side and remove duct (27).
(j)In wing, remove clamp (24).
(k)Note location of link support fittings (21) on feedthrough flange (2) and position of feedthrough (2).
(l)Hold protective casing (23) on wing side, and remove feedthrough (2) attachment screws (10) and washers (11).
(m)Remove feedthrough (2) and pressure seal (1) and check for correct condition.
On feedthrough :
1 Check for correct condition of flange. (Ref. Fig. 405).
2 Check that seal contact surfaces are smooth and free from scoring.
3 Check for absence of cracks or signs of fracture around attachment flange.
4 Check for condition of captive nuts (22).
(n)Cap open end of duct in wing.

(3)Installation
(a)Check condition of pressure seal (1) and discard if necessary.
(b)Install seal(s) (15) and (16) in retaining grooves on housing (17) according to seal type (Ref. 20-26-00, P. Block 1).
NOTE : Seal bearing surface must be smooth and free from major scoring.
(c)Remove blanking cap of duct in wing.
(d)Install feedthrough (2) and pressure seal (1), without tightening screws (10), on protective casing(23) and secure with captive nuts nuts (22). Do not forget to position link support fittings (21) in previously noted location. Connect bonding strip (20).
(e)Install protective casing (23) on freedthrough (2) and install clamp (24) in wing ; do not tighten at this stage.
(f)Install bonding strip (19) ; Tighten and safety screws (10).
(g)TORQUE clamp (24) in wing to the value given on clamp.
clamp (24) in wing to the value given on clamp.
(h)Makecertain that no tools or items of equipment have been left in the wing and close access door613RR.
(j)Removeblanking plugs/caps from duct (27).
(k)Position duct (27) on feedthrough (2) and install link (9), bolt (12) and nut (8) ; Tighten nut (8).
(l)Install link (26), bolt (18) and nut (25) ; Tighten nut (25).
(m)Install links (3) on support fittings (21) ; Install bolts (6), washers (5) and nuts (4) ; Tighten nuts (4).
NOTE : Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies.
(n)Install tee duct (13) next to crossfeed valve (Ref. 36-12-00, P. Block 401).
(p)Install any previously removed overheat sensing elements on this section of ducting (Ref. 36-22-12, P. Block 401).

(4)Close-up
(a)Make certain that working area is clean and clear of tools and

miscellaneous items of equipment.

R (b)Close access door.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE
R CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE
R THE ACCESS DOORS/PANELS AT FR47.

R 1 Close air conditioning compartment access door 147BZ.

(c)Close main gear doors (Ref. 32-12-11, P. Block 301).

(d)Remove access platform.

(e)Remove warning notices.

7. Removal/Installation of Engine Bleed Air Ducting

A. Reason for the Job
(1)Removal/Installation of Engine Bleed Air Ducting

B. Equipment and Materials

ITEM	DESIGNATION
A. Material No.P03-001	Oils (Ref. 70-00-00)
B. Material No.P06-013	Lubricants (Ref. 70-00-00)
C.	Gaskets
D.	Lockwire Dia. 0.8 mm (0.032 in.)
E.	Blanking Plugs/Caps
F.	Access platform 2.5 m (8 ft.)
G.	Circuit Breaker Safety Clips
H.	Warning Notices
J.	Torque Wrench 50 - 690 lbf.in. (0.56 - 7.80 m.daN)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

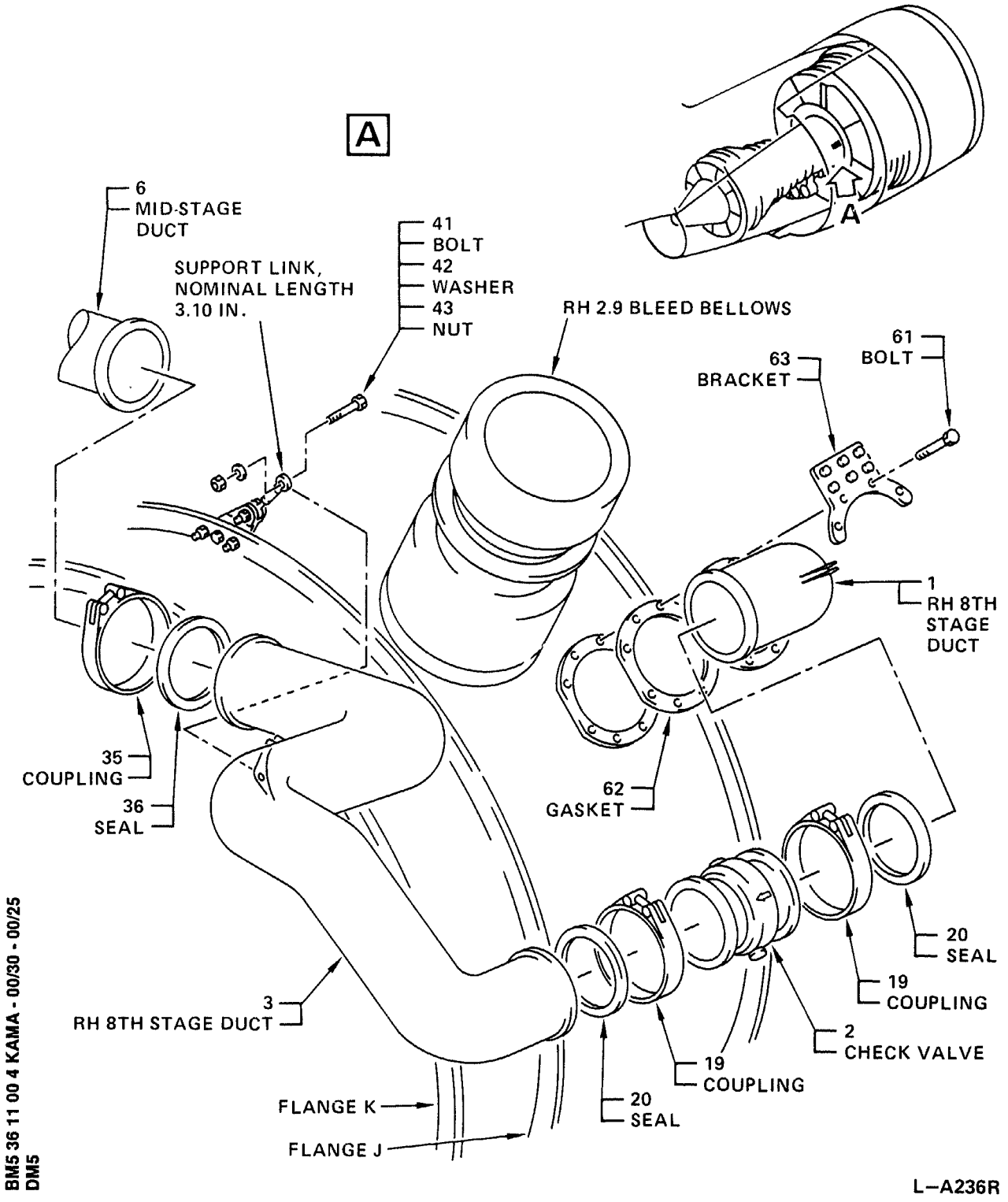
C. Job Set-Up
(1)WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
- START UP OF APPROPRIATE ENGINE
- PRESSURIZATION OF PNEUMATIC SYSTEM
(2)Open, safety and tag the following circuit breakers for appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG 1/WARN	9HA	203/G15
22VU	AIR BLEED/ENG 1/CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG 1/CONTROLLER/CTL	7HA	209/A18
131VU	LEAK DET LOOPS/R PYLONS & APU & B	4HF	311/H51
131VU	AIR BLEED & COMPT TEMP/ENG 1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/ENG 1 VALVES/ BLEED	11HA	311/H54
131VU	AIR BLEED & COMPT TEMP/ENG 2/VALVES/ BLEED	12HA	311/H55
131VU	LEAK DET LOOPS/L PYLON & A	5HF	312/G51
131VU	LEAK DET LOOPS/TEST	1HF	312/G52
131VU	AIR BLEED & COMPT TEMP/ENG 2/ VALVES/HP	4HA	312/G53
131VU	AIR BLEED & COMPT TEMP/ENG 2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/VALVES/APU BLEED X FEED/CTL & WARN	4HV	312/G55
131VU	AIR BLEED & COMPT TEMP/VALVES/APU BLEED X FEED/AUTO CTL	2HV	315/D52

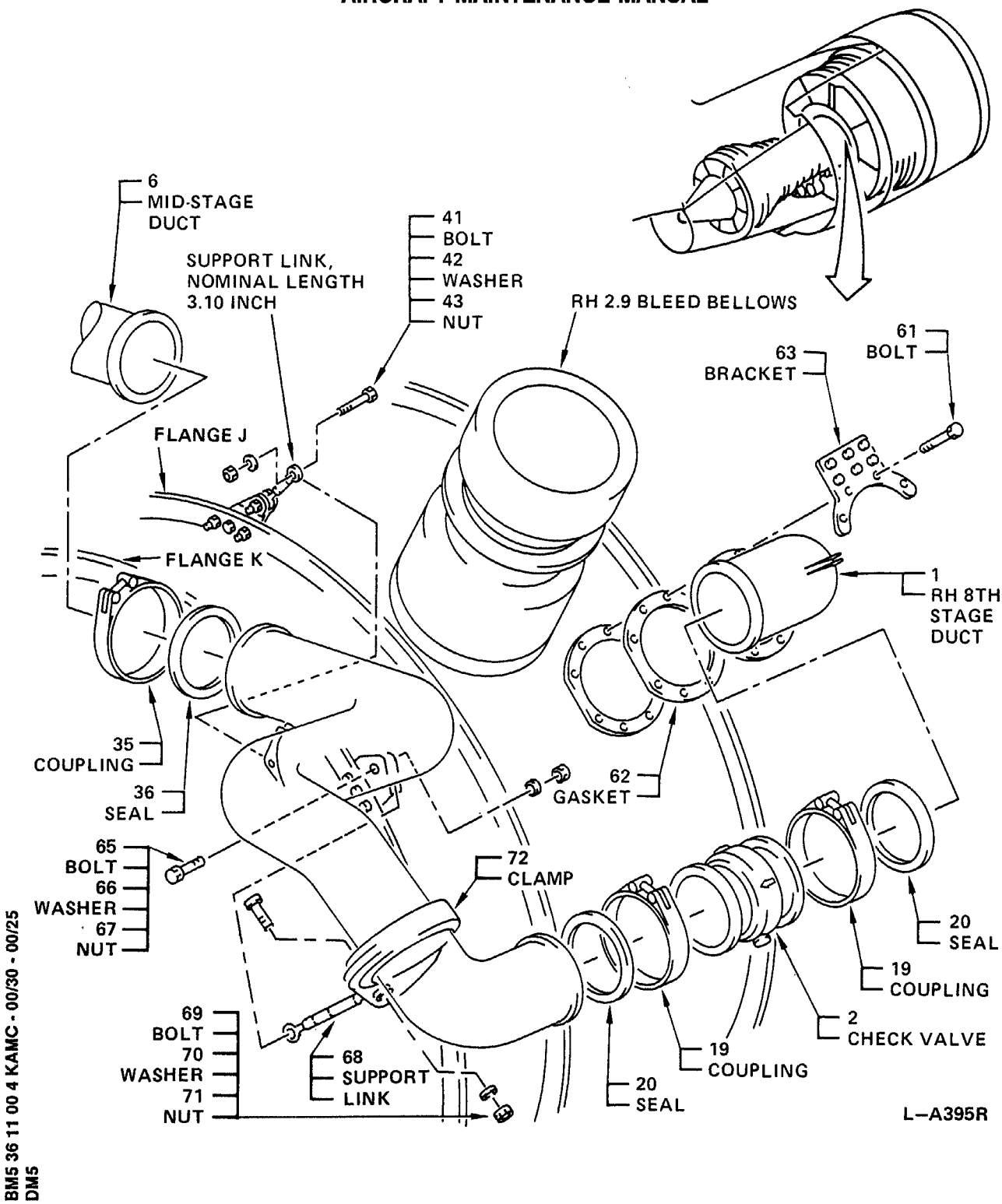
PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/ENG 2/CONTROLLER/ CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG 2/CONTROLLER/ MONITOR	6HA	315/D54

(3)Open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(4)Position access platform.

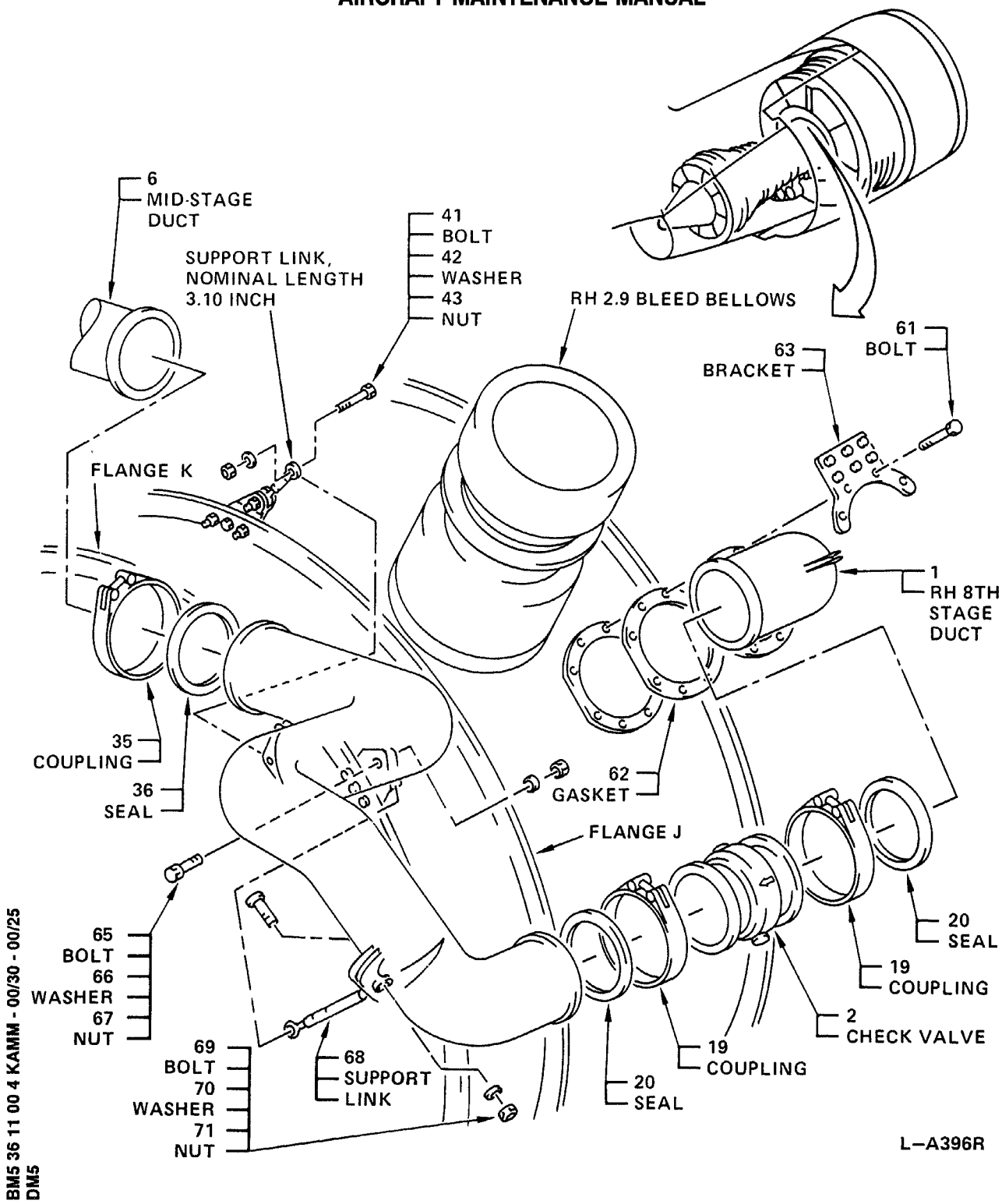
D. Removal
(1)Remove right 8th stage duct elbow (1)
(Ref. Fig. 410)
(a)Remove lockwire, eight bolts and gasket from duct flange at engine case. Discard gasket.
(b)Remove coupling and seal attaching duct to right intermediate pressure (IP) check valve (2).
(c)Install protective cover over engine port. Temporarily replace bolts in bolt holes in engine.
(2)Remove right IP check valve (2), and attaching coupling and seal, from right 8th stage bleed air duct (3) (Ref. Fig. 410).
(3)Remove right 8th stage bleed air duct (3) (Ref. Fig. 410).
(a)Remove bolt, washer and nut attaching duct to support link. Temporarily replace bolt, washer and nut in support link.
(b)For engines Post SB PW4NAC 36-6 or SB PW4NAC 36-9, remove bolt, washer and nut (65), (66), (67) attaching support link (68) to engine case bracket.(Ref. Fig. 410) (Sheet 2) or (Sheet 3).
(c)For engines Post SB PW4NAC 36-6 or SB PW4NAC 36-9, remove bolt, washer, and nut (69), (70), (71) attaching support link (68) to clamp (72) or bracket on right eighth stage duct (3). (Ref. Fig. 410) (Sheet 2) or (Sheet 3).
(d)For engines Post SB PW4NAC 36-6 only, remove two bolts, washers and nuts which attach the clamp (72) to the right eighth stage duct.
(e)Remove coupling and seal attaching duct to mid-stage duct (6).
(4)Remove anti-ice firewall duct (18).
(Ref. Fig. 411)
(a)Remove brackets supporting four drain lines to anti-ice firewall duct below engine.
(b)Remove couplings and seals attaching anti-ice firewall duct to anti-ice Y-Section and to anti-ice aft-lower duct (17).
(c)Remove bolt, washer and nut attaching duct to support link beneath fan housing. Temporarily replace bolt, washer and nut in support link.
(d)Install protective cover over anti-ice Y-Section.
(5)Remove anti-ice aft-lower duct (17).
(Ref. Fig. 412)
(a)Remove coupling and seal attaching duct to anti-ice upper duct (16).
(b)Remove bolt, washer and nut attaching duct to support link at bottom of engine. Temporarily replace bolt, washer and nut in support link.
(6)Remove anti-ice upper duct (16) (Ref. Fig. 412).
(a)Remove wire harness support clamp from duct.



Right 8th Stage Duct (Pre SBPW4NAC 36-6 or
SB PW4NAC 36-9) (Sheet 1/3)
Figure 410

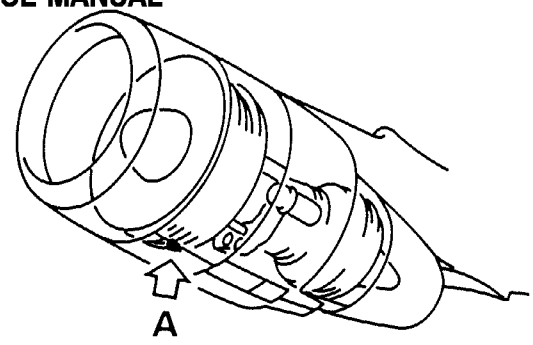


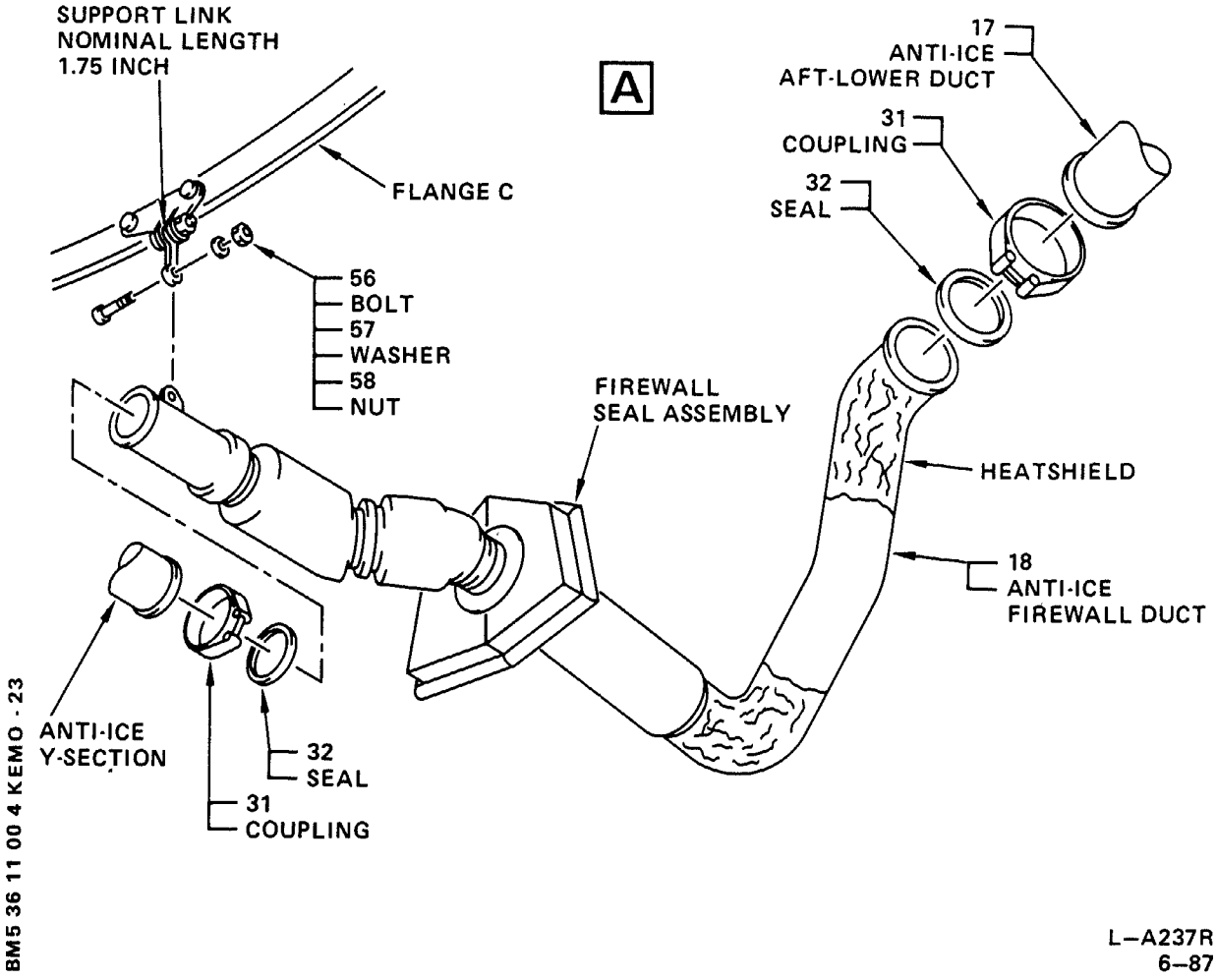
Right 8th Stage Duct (Post SB PW4NAC 36-6 or SB PW4NAC 36-9) (Sheet 2/3)
Figure 410



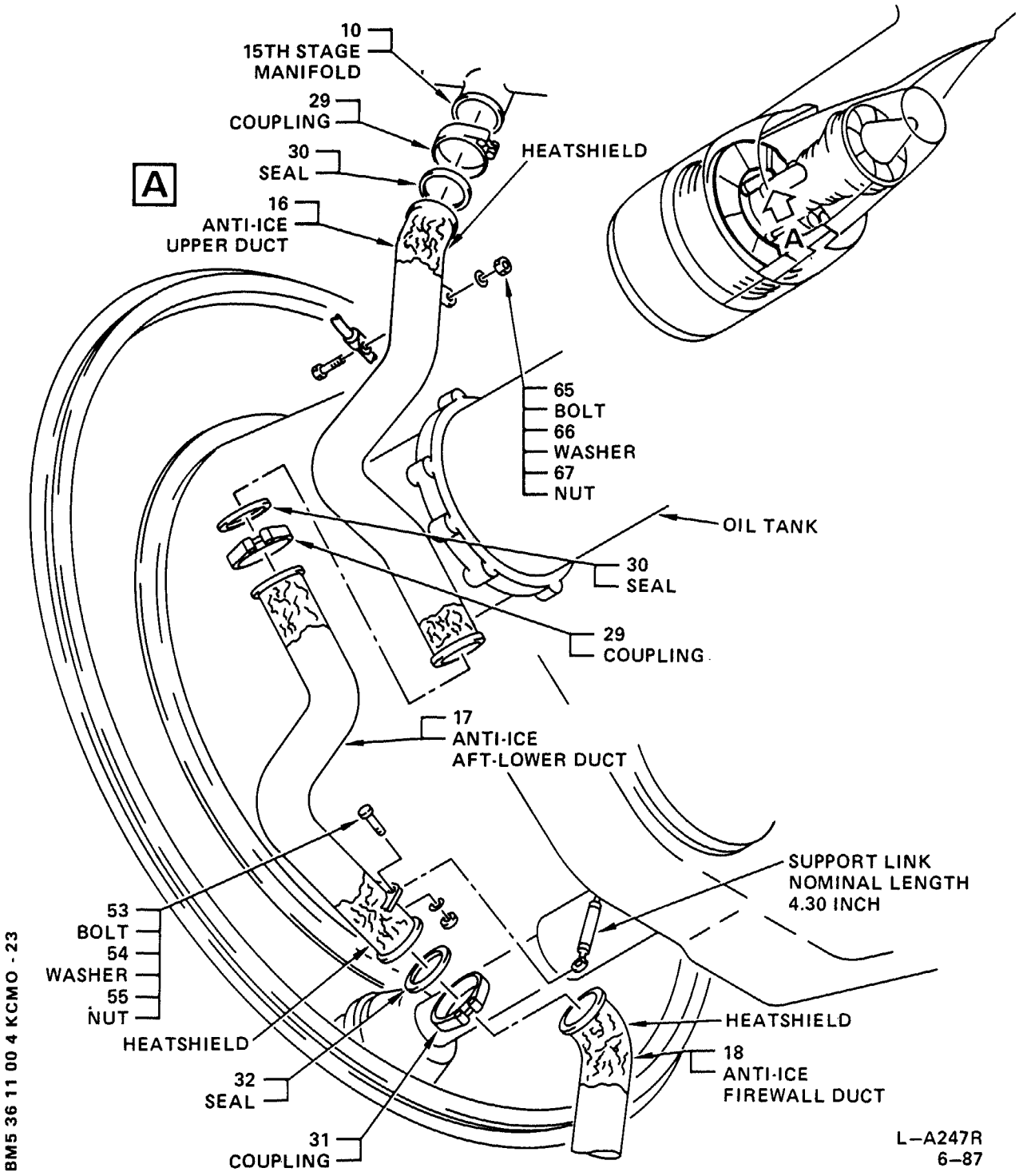
BM5 36 11 00 4 KAMM - 00/30 - 00/25
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Right 8th Stage Duct (Post SB PW4NAC 36-6 or SB PW4NAC 36-9) (Sheet 3/3)
Figure 410





Anti-Ice Duct Firewall
Figure 411



Anti-Ice Duct
Figure 412

(b)Remove coupling and seal attaching duct to 15th stage manifold (10).

(7)Remove starter upper duct (11).
(Ref. Fig. 413)
(a)Remove tube support clamps (two places) from duct.
(b)Remove couplings and seals attaching duct to regulated pressure elbow (4) and to starter intermediate duct (12).

(8)Remove starter intermediate duct (12) (Ref. Fig. 413).
(a)Remove coupling and seal attaching duct to starter lower duct (13).
(b)Remove bolts, washers and nuts attaching duct to two support links. Temporarily replace bolts, washers and nuts in support links.

(9)Remove starter lower duct (13).
(Ref. Fig. 414)
(a)Remove coupling and seal attaching duct to starter control valve (14).
(b)Remove bolts, washers and nuts attaching duct to two support links. Temporarily replace bolts, washers and nuts in support links.

(10)Remove starter control valve (14) (Ref. Fig. 414).
(a)Remove hose clamp and hose from top of starter control valve.
(b)Remove wire harness support clamp from forward side of starter control valve.
(c)Remove two wire harness support clamps from aft side of starter control valve.
(d)Disconnect electrical connector from bottom of starter control valve.
(e)Remove coupling and seal attaching valve to starter lower-forward duct (15).

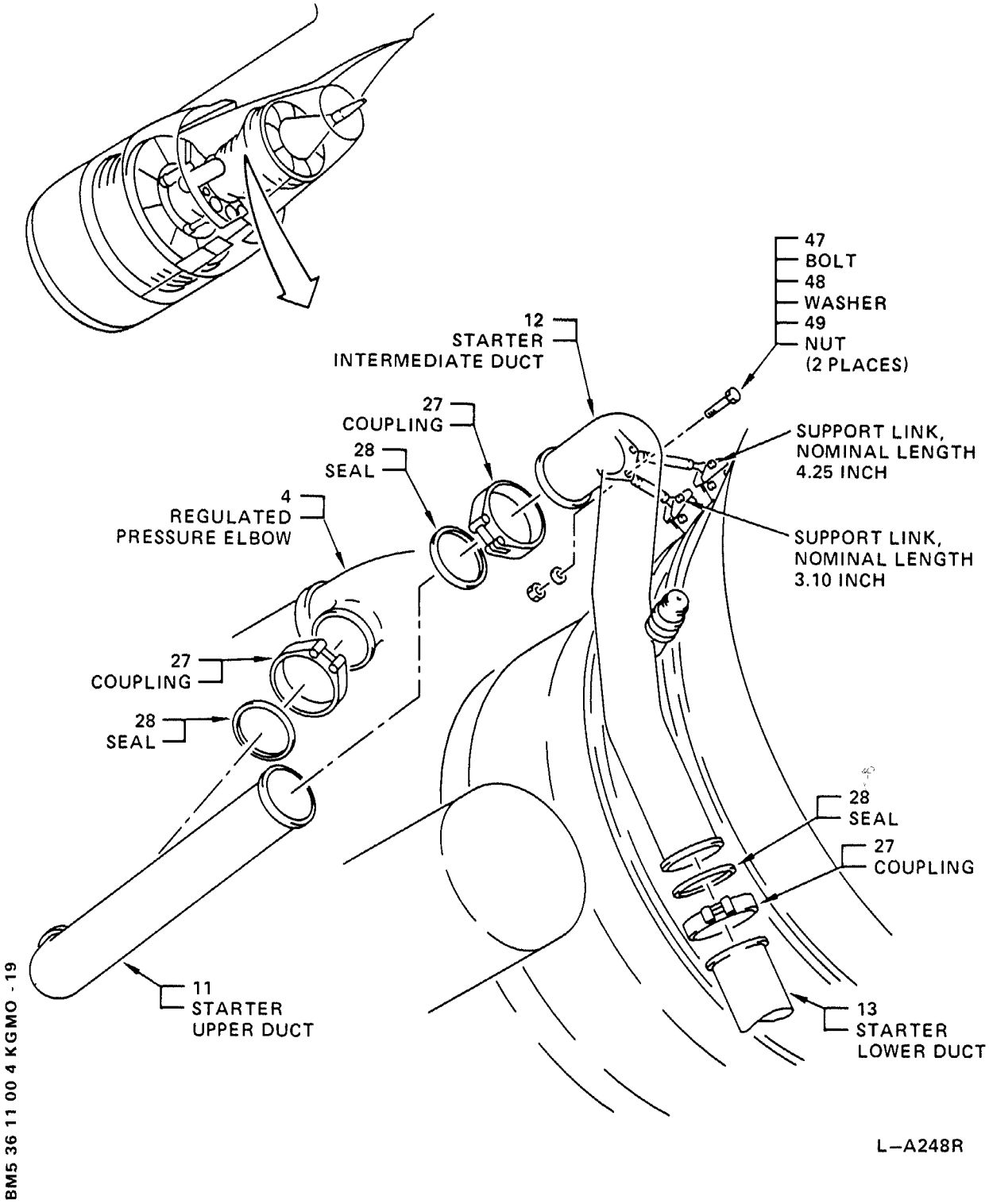
(11)Remove starter lower-forward duct (15) and attaching coupling and seal, from starter. Install protective cover over starter port
(Ref. Fig. 414).

(12)Remove regulated pressure elbow (4) (Ref. Fig. 415).
(a)Remove bolts, washers and nuts attaching duct to three support links. Temporarily replace bolts, washers and nuts in support links.
(b)Remove coupling attaching elbow to pylon interface.
(c)Remove coupling and seal attaching elbow to pneumatic regulating valve (5).
(d)Install protective cover over pylon interface port.

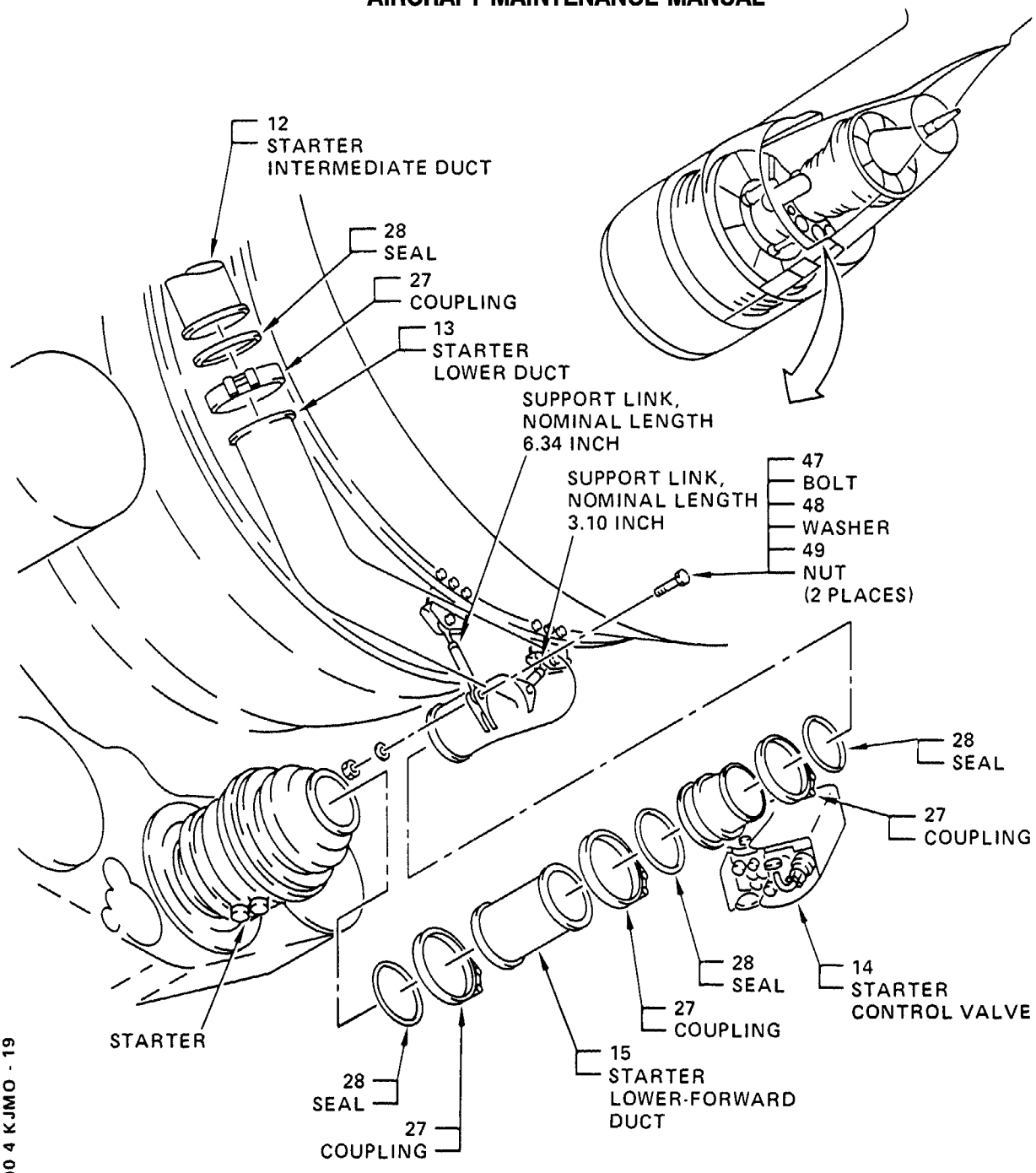
(13)Remove bleed valve (5).
(Ref. Fig. 415)
(a)Tag and disconnect two electrical connectors from valve.
(b)Remove wire harness support clamp from forward end of valve.
(c)Disconnect hydraulic sensor line from valve. Install protective cover over end of hydraulic line and valve port.
(d)Remove coupling and seal attaching valve to mid-stage duct (6).

(14)Remove mid-stage duct (6).
(Ref. Fig. 416)
(a)Disconnect hydraulic pressure line from top surface of duct. Install protective cover over end of hydraulic line and duct receptacle.
(b)Remove coupling and seal attaching duct to left 8th stage check valve (7).
(c)Remove coupling and seal attaching duct to HP valve (9).
(d)Remove bolt, washer and nut attaching duct to support link. Temporarily replace bolt, washer and nut in support link.

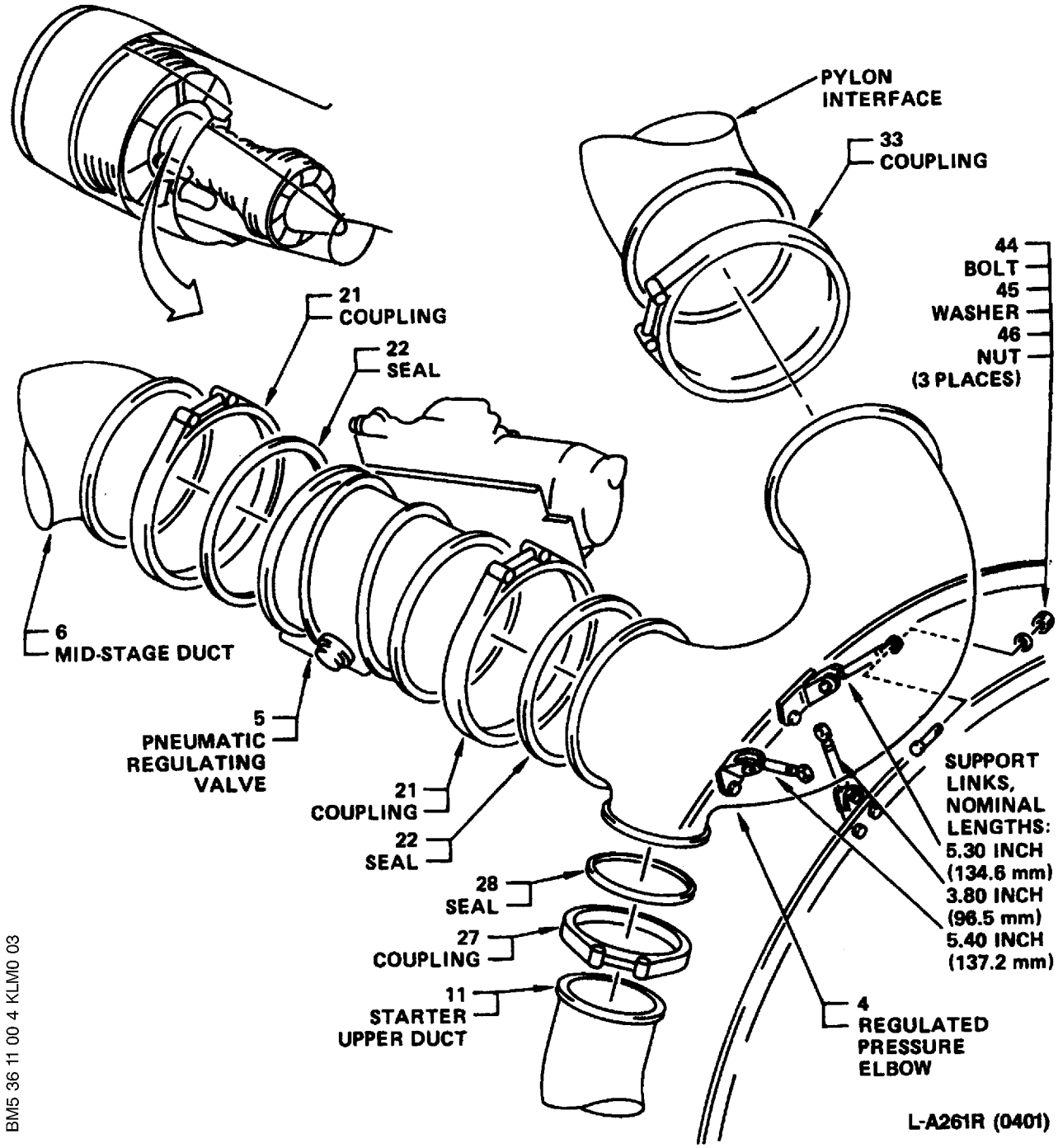
(15)Remove HP valve (9) (Ref. Fig. 416).



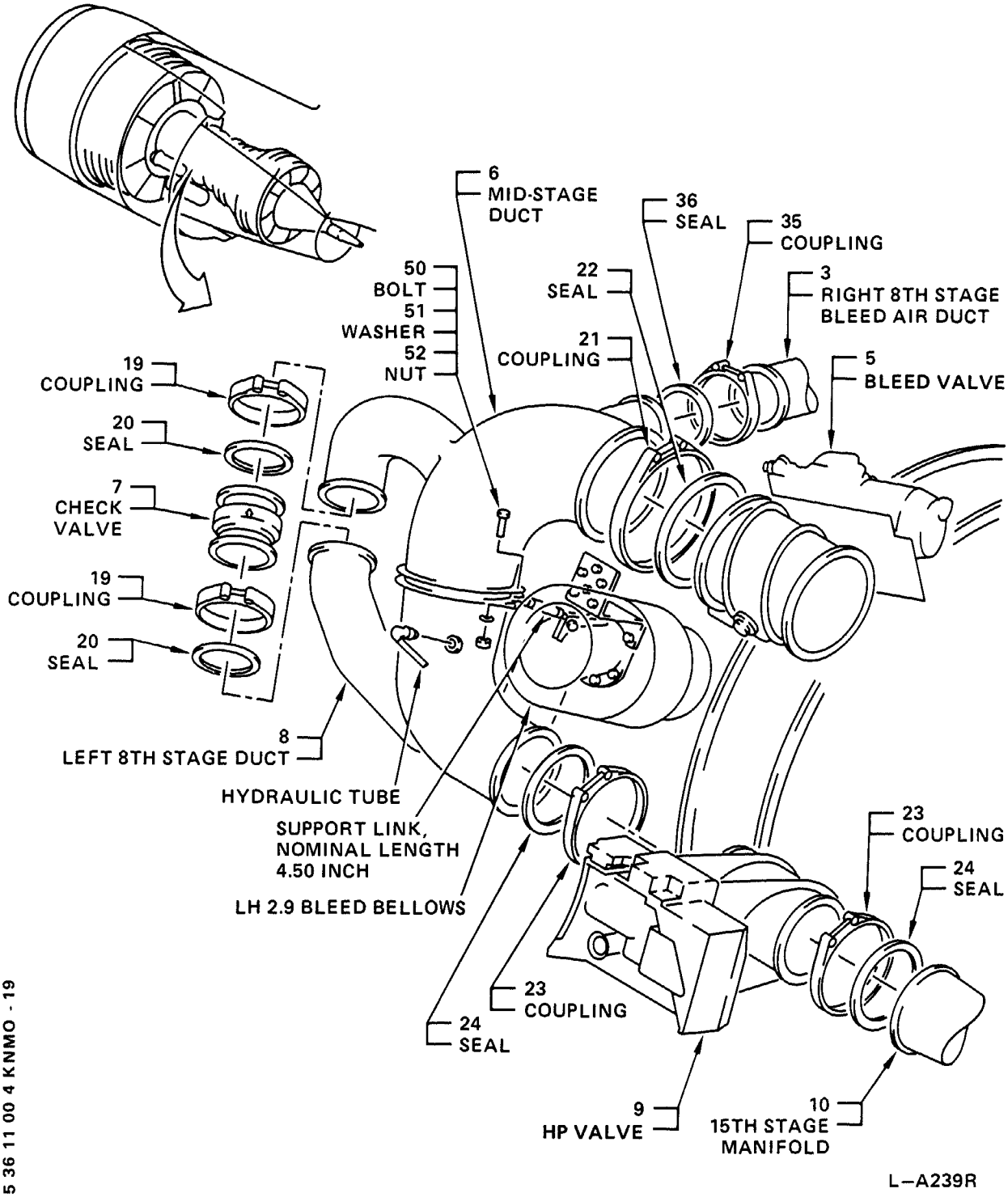
Starter Duct
Figure 413



Starter Duct
Figure 414



Mid Stage and Pressure Regulating Ducts
Figure 415



BM5 36 11 00 4 KNMO - 19

Mid Stage and Pressure Regulating Ducts
Figure 416

(a)Disconnect hydraulic sensor line from valve. Install protective cover over end of hydraulic line and over valve port.
(b)Tag and disconnect three electrical connectors from valve.
(c)Remove wire harness support clamp from valve.
(d)Remove coupling and seal attaching valve to 15th stage manifold (10).

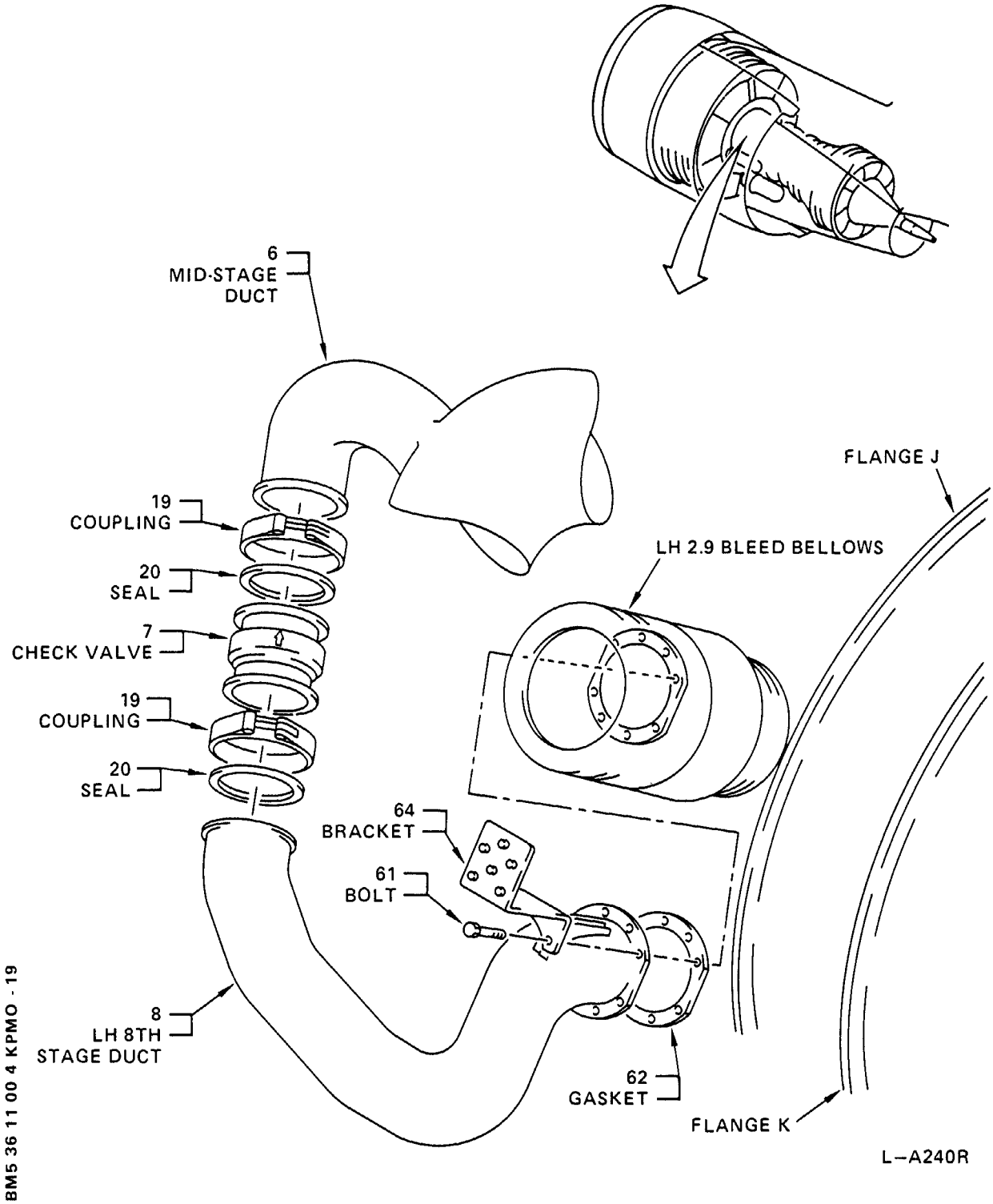
(16)Remove left 8th stage check valve (7) and attaching coupling and seal, from left 8th stage bleed air duct (8).
(Ref. Fig. 417)

(17)Remove left 8th stage bleed air duct (8) (Ref. Fig. 417).
(a)Remove lockwire, eight bolts and gasket from duct attachment to engine. Discard lockwire and gasket.
(b)Install protective cover over engine port. Temporarily replace bolts in bolt holes in engine.

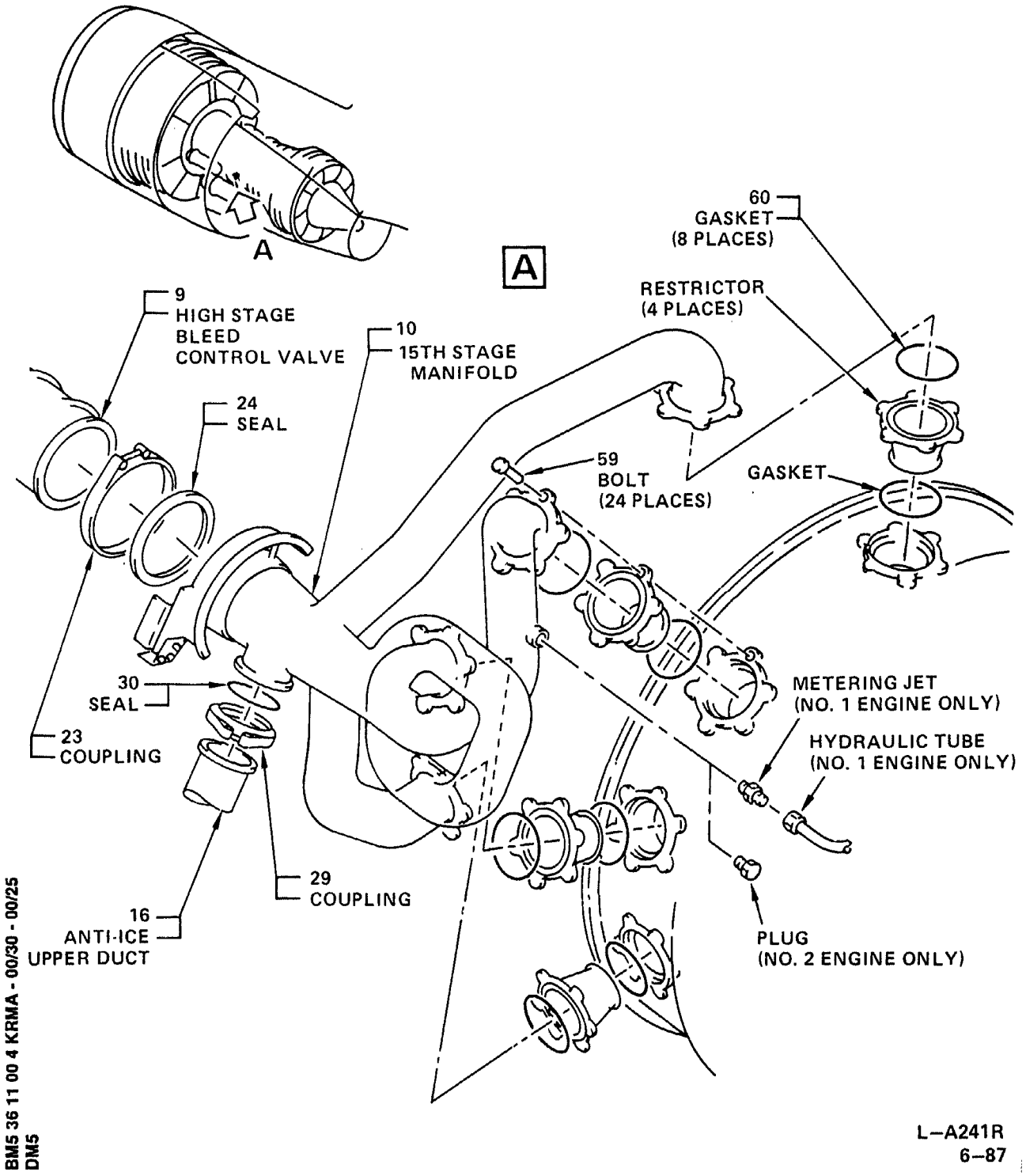
(18)Remove 15th stage manifold (10)
(Ref. Fig. 418)
(a)Remove two wire harness support clamps from forward end of manifold.
(b)Remove hydraulic line support clamp from forward end of manifold.
(c)If engine is at No. 1 position, disconnect hydraulic pressurization line from metering jet on fifteenth stage manifold. Be careful not to turn metering jet when disconnecting pressurization line. Install protective cover on pressurization line.
(d)If engine is at No. 1 position, remove metering jet from fifteenth stage manifold.
(e)If engine is at No. 2 position, remove plug from fifteenth stage manifold.
(f)On engines Post SB PW4NAC 36-4 or SB PW4NAC 36-8, remove bolt, washer, and nut (73), (74) and (75) attaching support link (77) to engine bracket (Ref. Fig. 418) (Sheet 2) or (Sheet 3).
(g)On engines Post SB PW4NAC 36-4 or SB PW4NAC 36-8, remove bolt, washer, and nut (73), (74) and (75) attaching support link (77) clamp (76) or bracket on 15th stage manifold (Ref. Fig. 418) (Sheet 2) or (Sheet 3).
(h)On engines Post SB PW4NAC 36-4 only, remove four bolts, washers, and nuts (78), (79) and (80) attaching clamp (76) to 15th stage manifold (Ref. Fig. 418) (Sheet 2).
(i)Remove lockwire, six bolts and gasket from duct attachment to engine, four places : 12 o'clock, 10:30 o'clock, 9:30 o'clock, and 8:30 o'clock positions. Discard lockwire and gaskets.
(j)Install protective cover over four engine ports. Temporarily replace bolts in bolt holes in engine.

E. Installation

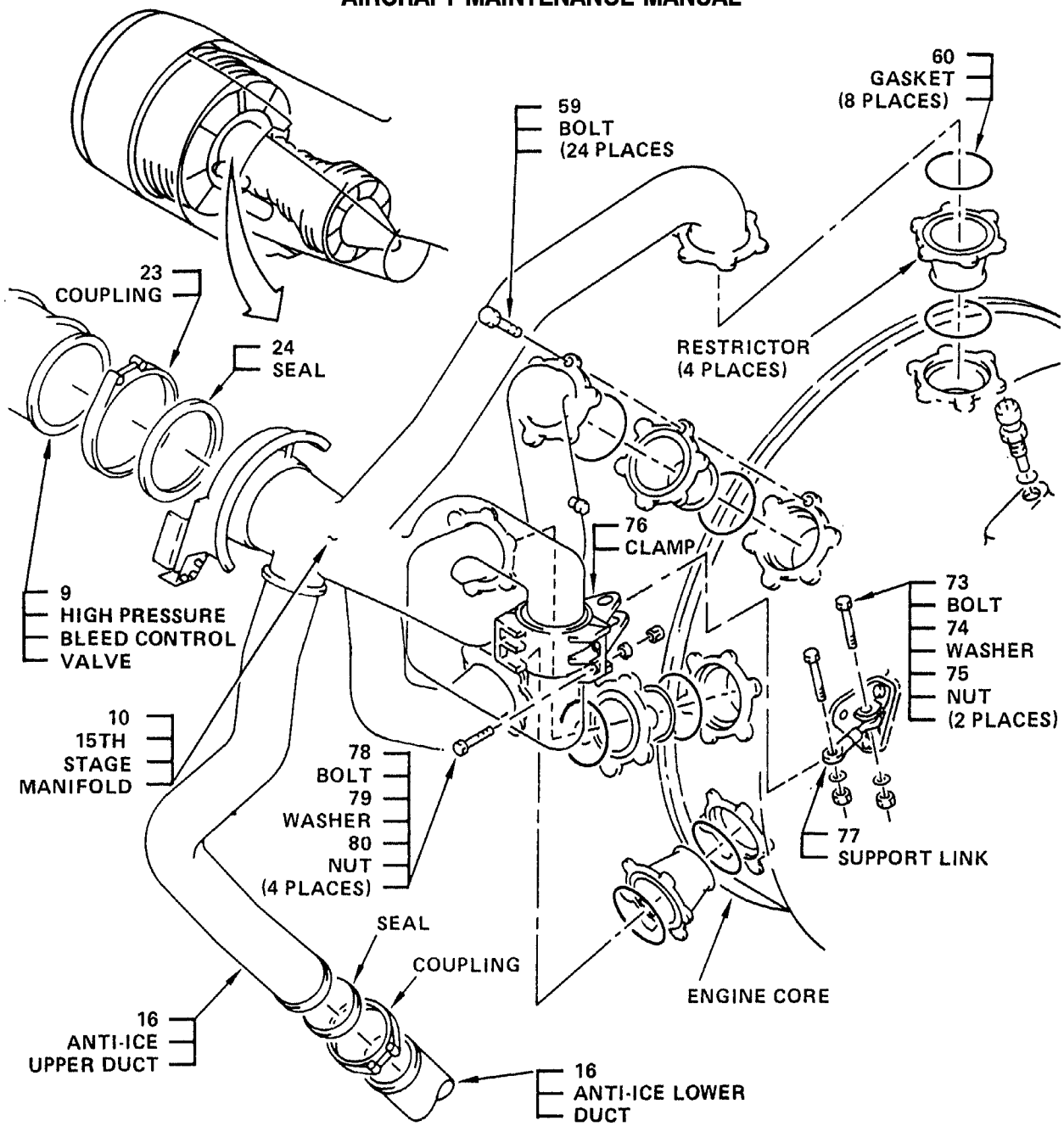
(1)Install 15th stage manifold (10) (Ref. Fig. 418).
(a)Remove protective covers from engine ports, four places : 15th stage at 12 o'clock, 10:30 o'clock, 9:30 o'clock and 8:30 o'clock.
(b)Install gaskets (60) on engine ports, four places.
(c)Position manifold over four engine ports. Ensure wire harnesses and hydraulic line are placed on top of forward end of 15th stage manifold.
(d)Lubricate bolts (59) with Material No.P03-001.
(e)Install six bolts (four places) attaching manifold to engine. TORQUE bolts to between 65 and 85 lbf. in. (0.73 and 0.96 m.daN). Wirelock.



Left 8th Stage Duct
Figure 417

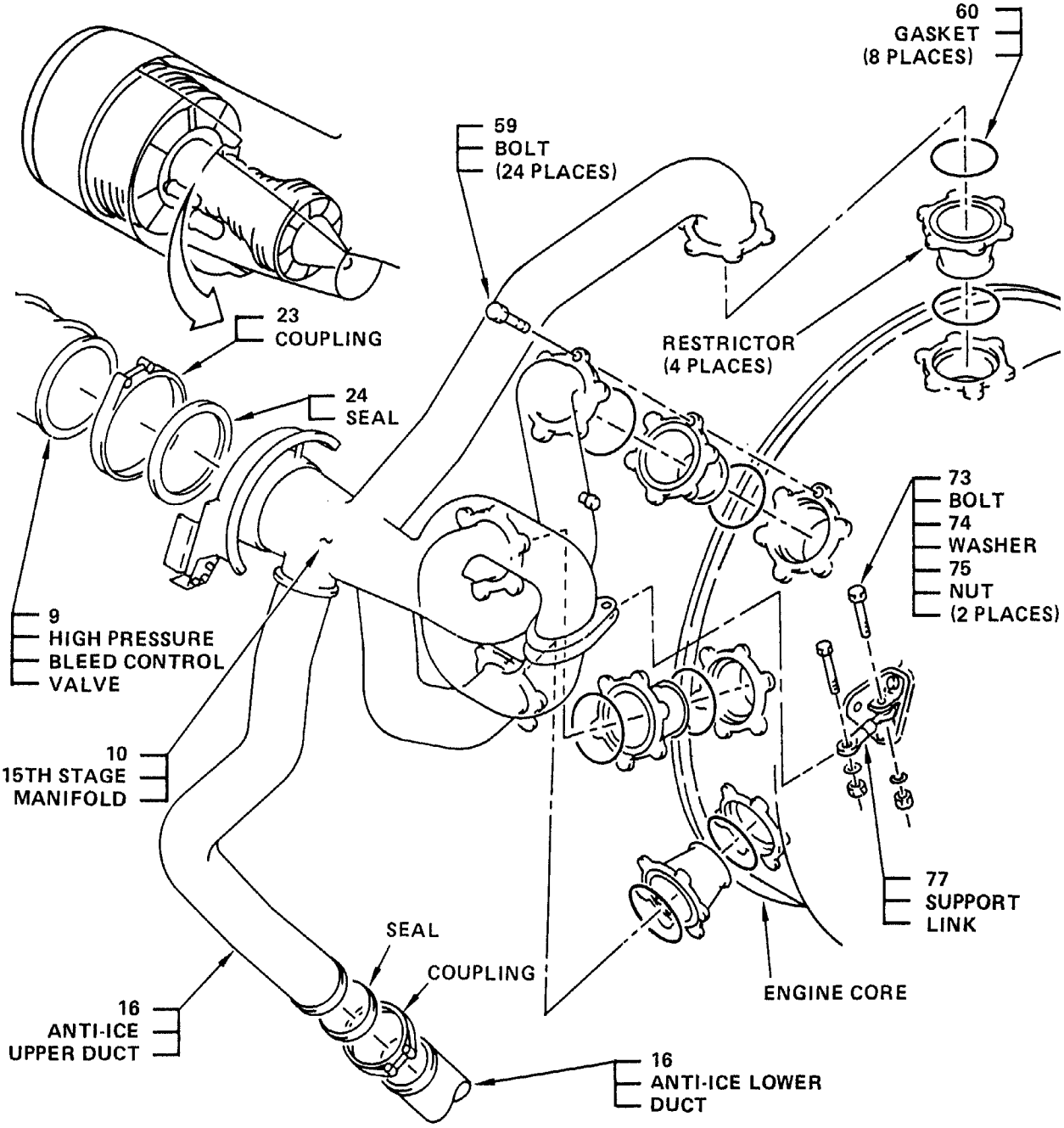


Fighteenth Stage Manifold (Pre SB PW4 NAC 36-4 or SB PW4 NAC 36-8) (Sheet 1/3)
Figure 418



BM5 36 11 00 4 KRMC - 00/30 - 00/25
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Fighteenth Stage Manifold (Post SB PW4 NAC 36-4 or SB PW4 NAC 36-8) (Sheet 2/3).
Figure 418



BM5 36 11 00 4 KRMM - 00/30 - 00/25
DM5

Fighteenth Stage Manifold (Post SB PW4 NAC 36-4 or SB PW4 NAC 36-8) (Sheet 3/3).
Figure 418

(f)On engines post SB PW4NAC 36-4 only, install clamp (76) on 15th stage manifold with four bolts, washers and nuts (78), (79), and (80). Tighten nuts fingertight. Ensure clamp bearing surfaces do not bear on the manifold weld bead (Ref. Fig. 418) (sheet 2).

(g)On engines post SB PW4NAC 36-4 or SB PW4NAC 36-8, adjust support link (77) to nominal length of 3.10 in. (78.74 mm). Attach support link to clamp (76) or bracket on 15th stage manifold with bolt, washer and nut (73), (74), and (75). Torque bolt to between 50 and 70lbf. in (0.57 and 0.79m.daN) (Ref. Fig. 418) (Sheet 2) or (Sheet 3).

(h)On engines Post SB PW4NAC 36-8, attach support link (77) to engine mounted bracket with bolt, washer and nut (739, (74) and (75). TORQUE bolt to between 50 and 70 lbf.in. (0.57 and 0.79 m.daN) (Ref. Fig. 418) (Sheet 2) or (Sheet 3).

(i)On engines Post SB PW4NAC 36-4 only, TORQUE four bolts of clamp (76) to between 45 and 55 lbf.in. (0.51 and 0.62 m.daN) (Ref. Fig. 418) (Sheet 2).

(j)If engine is at No. 1 position, install metering jet in hydraulic pressurization part of 15th stage manifold. TORQUE metering jet to between 90 and 100 lbf.in. (1.02 and 1.13 m.daN).

(k)Remove protective cover and install hydraulic reservoir pressurization tube on metering jet. TORQUE tube coupling to between 180 and 200 lbf.in. (2.04 and 2.26 m.daN). Be careful not to turn metering jet when torqing tube couplings.

(l)If engine is at No. 2 position install plug in hydraulic reservoir pressurization port in 15th stage manifold. TORQUE plug to between 90 and 100 lbf.in. (1.02 and 1.13 m.daN).

(2)Install left 8th stage bleed air duct (8) (Ref. Fig. 417).

(a)Remove protective cover from engine port, 8th stage at 9:30 o'clock.

(b)Install gasket (62) on engine port.

(c)Position duct over engine port.

(d)Position bracket (64) over duct attaching flange.

(e)Lubricate bolts (61) with Material No.P03-001.

(f)Install eight bolts attaching duct to engine. TORQUE bolts to between
R 85 and 95 lbf. in. (0.96 and 1.07 m.daN).

(3)Install left 8th stage check valve (7) (Ref. Fig. 417)

(a)Lubricate inside surface of duct coupling (19) with Material No.P06-013.

CAUTION : OBSERVE DIRECTION OF ARROW ON CHECK VALVE. POINT ARROW AWAY FROM LEFT 8TH STAGE BLEED AIR DUCT (8).

(b)Position valve, with arrow visible, on left 8th stage bleed air duct (8). Place coupling seal (20) between mating flanges.

(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).

(d)Attach valve to left 8th stage bleed air valve (8) with coupling (19) and seal (20). Tighten coupling fingertight.

(4)Install regulated pressure elbow (4) (Ref. Fig. 415).

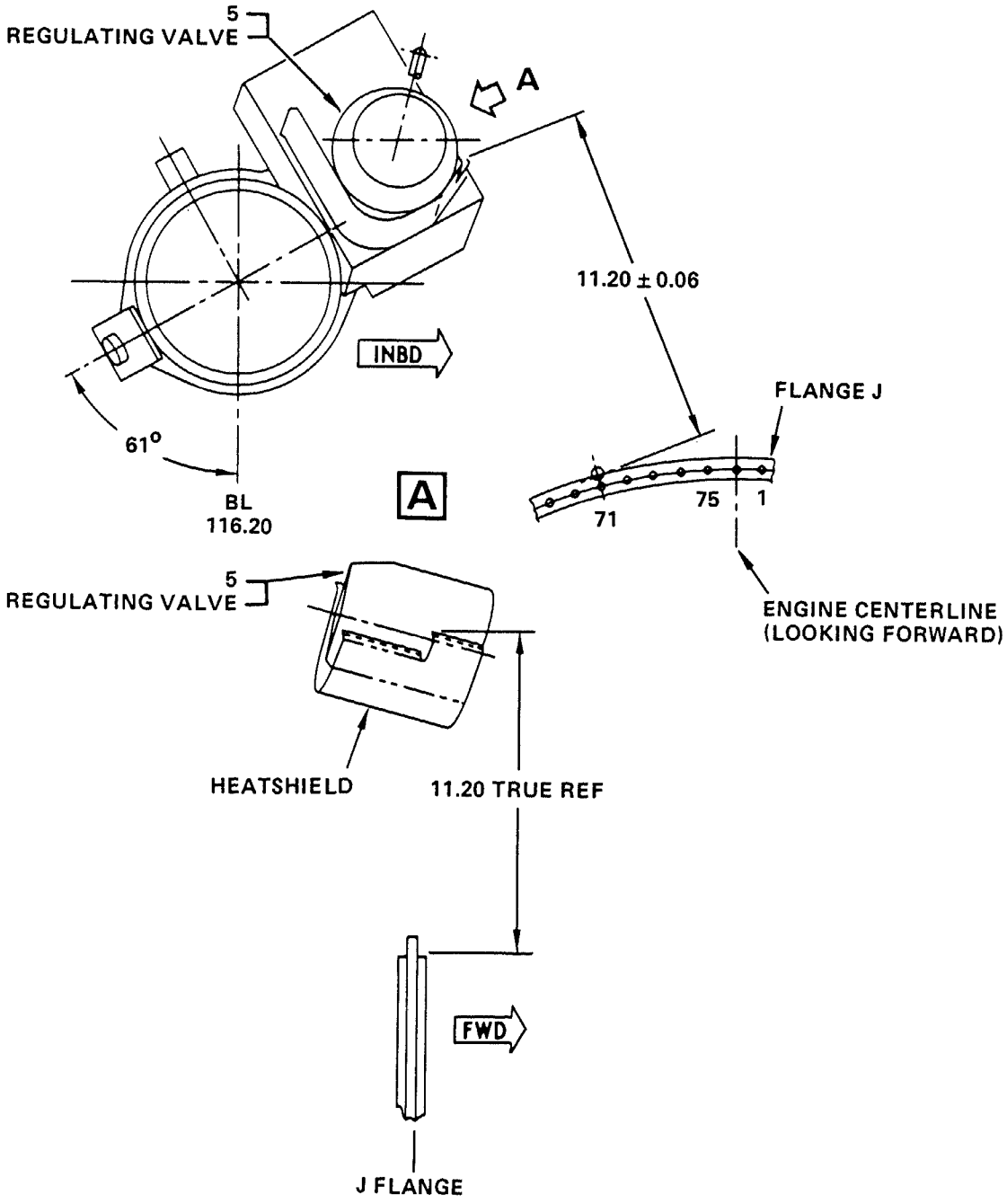
(a)Remove protective cover from pylon interface port.

(b)Lubricate inside surface of duct coupling (33) with Material No.P06-013.

(c)Position regulated pressure elbow (4) on pylon interface port.
(d)Check that outside diameters of mating flanges are aligned radially with 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(e)Attach elbow to pylon interface port with coupling (33). Tighten coupling fingertight.
NOTE : The nominal length of the links is measured from the center of rod ends.
(f)Set three support links to the following nominal lengths.
Upper 5.30 in. (134.6 mm).
Middle 3.80 in. (96.5 mm).
Lower 5.4 in. (137.1 mm).
TORQUE locking nuts to between 100 and 140 lbf. in. (1.13 and 1.58 m.daN).
(g)Install bolts, washers and nuts (44), (45), (46), attaching regulated pressure elbow to three support links. TORQUE nuts (both ends) to between 160 and 190 lbf. in. (1.81 and 2.15 m.daN).

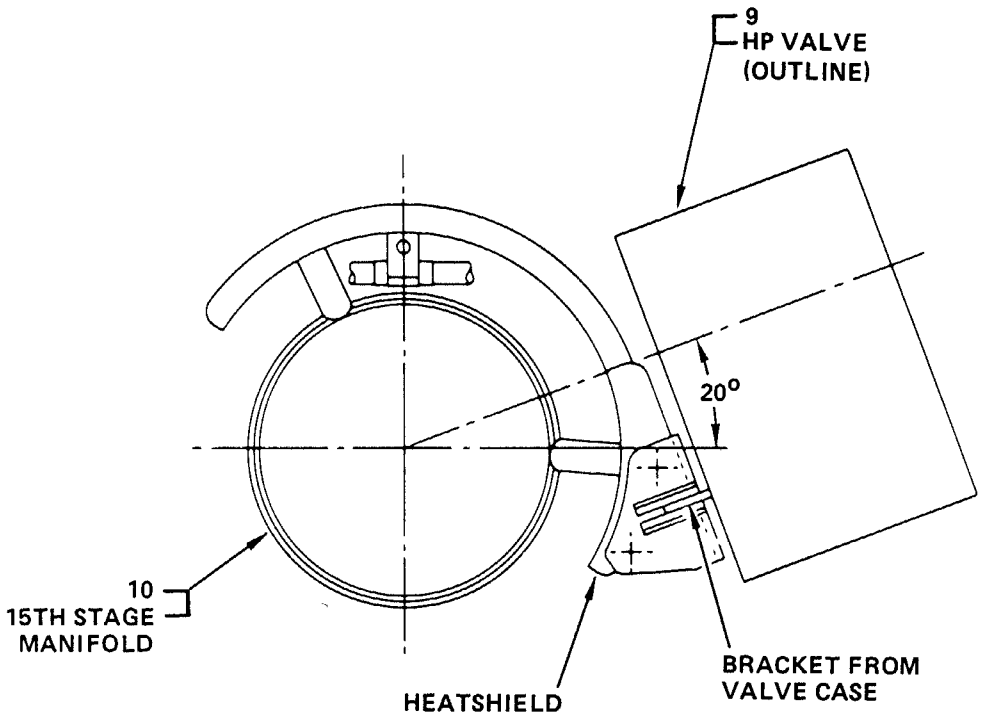
(5)Install bleed valve (5) (Ref. Fig. 415, 419).
(a)Lubricate inside surface of duct coupling (21) with Material No.P06-013.
(b)Position valve on regulated pressure elbow (4). Place coupling seal (22) between mating flanges.
(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(d)Attach valve to regulated pressure elbow (4) with coupling (21) and seal (22).
(e)Orient valve by setting the valve heat shield 11.20 in. (284.48 mm) from engine flange J. Tighten coupling fingertight.
(Ref. Fig. 419)
(f)Connect two electrical connectors to valve. Tighten connectors finger-tight plus one-eighth turn.
(g)Attach wire harness support clamp to forward end of valve.
(h)Connect hydraulic sensor tube to valve. TORQUE tube connection to between 180 and 200 lbf. in. (2.04 and 2.26 m.daN).

(6)Install HP valve (9) (Ref. Fig. 416, 420).
(a)Make certain that electrical cables and hydraulic line are placed on top of forward end of 15th stage manifold (10).
(b)Lubricate inside surface of duct coupling (23) with Material No.P06-013.
CAUTION : OBSERVE DIRECTION OF ARROW ON VALVE. POINT ARROW FORWARD.
(c)Orient valve so bracket on bottom of valve fits into slot formed by brackets of heat shield on end of 15th stage manifold (10).
(Ref. Fig. 420)
(d)Position valve on forward end of 15th stage manifold (10). Place coupling seal (24) between mating flanges.
(e)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(f)Attach valve to 15th stage manifold (10) with coupling (23) and seal (24). Tighten coupling fingertight.



BM5 36 11 00 4 KTMO - 25 - 20
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Bleed Valve-Orientation
Figure 419



BM5 36 11 00 4 KTPO - 25 - 20
DM5

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HP Valve-Orientation
Figure 420

(g)Connect hydraulic sensor tube to base of valve. TORQUE tube connection to between 180 and 200 lbf. in. (2.04 and 2.26 m.daN).
(h)Connect three electrical connectors to valve. Tighten connectors fingertight plus one-eighth turn.
(i)Attach wire harness support clamp to lower-aft corner of valve.
(j)Attach two cable harness clamps to heat shield over forward end of 15th stage manifold (10).
(k)Attach hydraulic sensor line support clamp to heat shield over forward end of 15th stage manifold (10).

(7)Install mid-stage duct (6) (Ref. Fig. 416).
(a)Lubricate inside surface of duct coupling (23) with Material No.P06-013.
(b)Position duct on HP valve (9). Place coupling seal (24) between mating flanges.
(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(d)Attach duct to HP valve (9) with coupling (23) and seal (24). Tighten coupling fingertight.
(e)Lubricate inside surface of duct coupling (21) with Material No.P06-013.
(f)Position duct on bleed valve (5). Place coupling seal (22) between mating flanges.
(g)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(h)Attach duct to bleed valve (5) with coupling (21) and seal (22). Tighten coupling fingertight.
(i)Lubricate inside surface of duct coupling (19) with Material No.P06-013.
(j)Position duct on left 8th stage check valve (7). Place coupling seal (20) between mating flanges.
(k)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(l)Attach duct to left 8th stage check valve (7) with coupling (19) and seal (20). Tighten coupling fingertight.
NOTE : The nominal length of the links is measured from the center of rod ends.
(m)Set support link to nominal length of 4.50 in. (114.3 mm), then adjust one-half turn shorter to provide slight tension.
locking nuts to between 100 and 140 lbf. in. (1.13 and 1.58 m.daN).
(n)Install bolt, washer and nut (50), (51), (52) attaching duct to support link. TORQUE nuts (both ends) to between 480 and 690 lbf. in. (5.42 and 7.80 m.daN).
(o)Connect hydraulic pressure tube to top of duct. TORQUE tube connection to between 180 and 200 lbf. in. (2.04 and 2.26 m.daN).

(8)Install starter lower-forward duct (15) (Ref. Fig. 414).
(a)Remove protective cover from starter port.
(b)Lubricate inside surface of duct coupling (27) with Material No.P06-013.

(c)Orient duct by fitting key on duct to key slot on starter.
(d)Position duct on starter port. Place coupling seal (28) between mating flanges.
(e)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(f)Attach duct to starter port with coupling (27) and seal (28). Tighten coupling fingertight.

(9)Install starter control valve (14) (Ref. Fig. 414).
(a)Lubricate inside surface of duct coupling (27) with Material No.P06-013.
(b)Orient valve by fitting key on valve to key slot on starter lower-forward duct (15).
(c)Position valve on starter lower-forward duct (15). Place coupling seal (28) between mating flanges.
(d)Verify that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(e)Attach valve to starter lower-forward duct (15) with coupling (27) and seal (28). Tighten coupling fingertight.
(f)Connect electrical connector to bottom of valve. Tighten connector fingertight plus one-eighth turn.
(g)Attach two electrical harness support clamps to aft side of valve.
(h)Attach cable harness support clamp on forward side of valve.
(i)Attach hose to top of valve with hose clamp.

(10)Install starter lower duct (13) (Ref. Fig. 414).
(a)Lubricate inside surface of duct coupling (27) with Material No.P06-013.
(b)Position duct on starter control valve (14). Place coupling seal (28) between mating flanges.
(c)Verify that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(d)Attach duct to starter control valve (14) with coupling (27) and seal (28). Tighten coupling fingertight.
NOTE : The nominal length of the links is measured from the center of rod ends.
(e)Set two support links to the following nominal lengths, then adjust one-half turn shorter to provide slight tension:
Left 6.34 in. (161 mm)
Right 3.10 in. (78.7 mm)
TORQUE locking nuts to between 100 and 140 lbf. in. (1.13 and 1.58 m.daN).
(f)Install bolts, washers and nuts (47), (48), (49) attaching starter lower duct to two support links. TORQUE nuts (both ends) to between 50 and 70 lbf. in. (0.56 and 0.79 m.daN).

(11)Install starter intermediate duct (12) (Ref. Fig. 413).
(a)Lubricate inside surface of duct coupling (27) with Material No.P06-013.
(b)Position duct on starter lower duct (13). Place coupling seal (28) between mating flanges.

(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(d)Attach duct to starter lower duct (13) with coupling (27) and seal (28). Tighten coupling fingertight.
NOTE : The nominal length of the links is measured from the center of rod ends.
(e)Set two support links to the following nominal lengths, then adjust one-half turn shorter to provide slight tension:
Lower 3.10 in. (78.7 mm)
Upper 4.25 in. (107.9 mm)
TORQUE locking nuts to between 100 and 140 lbf. in. (1.13 and 1.58 m.daN).
(f)Install bolts, washers and nuts (47), (48), (49) attaching starter intermediate duct to two support links. TORQUE nuts (both ends) to between 50 and 70 lbf. in. (0.56 and 0.79 m.daN).

(12)Install starter upper duct (11) (Ref. Fig. 413).
(a)Lubricate inside surface of duct coupling (27) with Material No. P06-013.
(b)Position duct on regulated pressure elbow (4). Place coupling seal (28) between mating flanges.
(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(d)Attach duct to regulated pressure elbow (4) with coupling (27) and seal (28). Tighten coupling fingertight.
(e)Lubricate inside surface of duct coupling (27) with Material No.P06-013.
(f)Position duct on starter intermediate duct (12). Place coupling seal (28) between mating flanges.
(g)Verify that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(h)Attach duct to starter intermediate duct (12) with coupling (27) and seal (28). Tighten coupling fingertight.
(i)Attach small tubes support clamps, two places, on upper surface of duct.

(13)Install anti ice upper duct (16) (Ref. Fig. 412).
(a)Lubricate inside surface of duct coupling (29) with Material No.P06-013.
(b)Position duct on 15th stage manifold (10). Place coupling seal (30) between mating flanges.
(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).
(d)Attach duct to 15 th stage manifold (10) with coupling (29) and seal (30). Tighten coupling fingertight.
(e)Attach wire harness support clamp on forward edge near top of anti ice upper duct.

(14)Install anti ice aft lower duct (17) (Ref. Fig. 412).
(a)Lubricate inside surface of duct coupling (29) with Material

No.P06-013.

(b)Position duct on anti ice upper duct (16). Place coupling seal (30) between mating flanges.

(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).

(d)Attach duct ot anti ice upper duct (16) with coupling (29) and seal (30). Tighten coupling fingertight.

NOTE : The nominal length of the links is measured from the center of rod ends.

(e)Set support link to nominal length of 4.30 in. (109.2 mm), then adjust one-half turn shorter to provide slight tension. TORQUE locking nuts to between 100 and 140 lbf. in. (1.13 and 1.58 m.daN).

(f)Install bolt, washer and nut (53), (54), (55) attaching duct to support link. TORQUE nut (both ends) to between 50 and 70 lbf. in. (0.56 and 0.79 m.daN).

(15)Install anti ice firewall duct (18) (Ref. Fig. 411).

(a)Remove protective cover from anti ice Y-Section port.

(b)Lubricate inside surface of duct coupling (31) with Material No.P06-013.

(c)Position duct on anti ice aft lower duct (17). Place coupling seal (32) between mating flanges.

(d)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).

(e)Attach duct to anti ice aft lower duct (17) with coupling (31) and seal (32). Tighten coupling fingertight.

(f)Lubricate inside surface of duct coupling (31) with Material No.P06-013.

(g)Position duct on anti ice Y Section. Place coupling seal (32) between mating flanges.

(h)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).

(i)Attach duct to anti ice Y Section with coupling (31) and seal (32). Tighten coupling fingertight.

(j)Install bolt, washer and nut (56), (57), (58) attaching duct to support link. TORQUE nut (both ends) to between 50 and 70 lbf. in. (0.56 and 0.79 m.daN).

(k)Attach drain line support clamps to duct, four places.

(16)Install right 8th stage duct (3) (Ref. Fig. 410).

(a)Lubricate inside surface of duct coupling (35) with Material No.P06-013.

(b)Position duct on mid-stage duct (6). Place coupling seal (36) between mating flanges.

(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating face of flanges is not greater than 0.04 in. (1 mm).

(d)Attach duct to mid-stage duct (6) with coupling (35) and seal (36). Tighten coupling fingertight.

NOTE : The nominal length of the links is measured from the center of

rod ends.

(e)Set support link to nominal length of 2.62 in. (66.55 mm), then adjust one-half turn shorter to provide slight tension. TORQUE lock nuts to between 100 and 140 lbf. in. (1.13 and 1.58m.daN).

(f)Install bolt, washer and nut (41), (42), (43) attaching duct to support link. TORQUE nut (both ends) to between 50 and 70 lbf. in. (0.56 and 0.79 m.daN).

(g)On engines Post SB PW4NAC 36-6 or SB PW4NAC 36-9, adjust support link (68) for no-preload length plus one half turn in the tension direction. Attach support link (68) to bracket on engine flange K with bolt, washer and nut (69), (70) and (71). TORQUE bolt to between 50 and 70 lbf.in. (0.57 and 0.79 m.daN) (Ref. Fig. 410) (Sheet 2) or (Sheet 3).

(h)On engines Post SB PW4NAC 36-6 only, attach clamp (72) to 8th. stage duct with two bolts, washers and nuts. Adjust clamp as required to align link between the clamp and the engine bracket on flange K. (Ref. Fig. 410) (Sheet 2).

(i)On engines Post SB PW4NAC 36-6 or SB PW4NAC 36-9, attach support link (68) to clamp (72) or bracket on 8th stage duct with bolt, washer and nut (69), (70) and (71). TORQUE bolt to between 50 and 70 lbf.in. (0.57 and 0.79 m.daN) (Ref. Fig. 410) (Sheet 2) or (Sheet 3).

(j)On engines Post SB PW4NAC 36-6 only, TORQUE two bolts on clamp (76) to between 45 and 55 lbf.in. (0.51 and 0.62 m.daN) Maintain 0.050 - 0.110 in. (1.27 - 2.79 mm) gap between clamp halves. (Sheet 2).

(17)Install right IP check valve (2) (Ref. Fig. 410).

(a)Lubricate inside surface of duct coupling (19) with Material No.P06-013.

CAUTION : OBSERVE DIRECTION OF ARROW ON CHECK VALVE. POINT ARROW TOWARD RIGHT 8TH STAGE BLEED AIR DUCT (3).

(b)Position valve, with arrow visible, on right 8th stage bleed air duct (3). Place coupling seal (20) between mating flanges.

(c)Check that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).

(d)Attach valve to right 8th stage bleed air duct (3) with coupling (19) and seal (20). Tighten coupling fingertight.

(18)Install right 8th stage duct elbow (1) (Ref. Fig. 410).

(a)Remove protective cover from engine port, 8th stage at 11 o'clock.

(b)Lubricate inside surface of duct coupling (19) with Material No.P06-013.

(c)Position elbow on right IP check valve (2). Place coupling seal (20) between mating flanges.

(d)Verify that outside diameters of mating flanges are aligned radially within 0.06 in. (1.5 mm), and angular gap between mating faces of flanges is not greater than 0.04 in. (1 mm).

(e)Attach elbow to right IP check valve (2) with coupling (19) and seal (20). Tighten coupling fingertight.

(f)Install gasket (62) on engine port.

(g)Position elbow on engine port.

(h)Position bracket (63) over duct attaching flange.
(i)Lubricate bolts (61) with Material No.P03-001.
(j)Install eight bolts. TORQUE bolts to between 85 and 95 lbf. in. (0.96 and 1.07 m.daN).

(19)TORQUE all couplings and support links.
(a)TORQUE all couplings to value marked on each coupling. Tap coupling lightly with a fiber hammer, then recheck torque. Start with 15th stage manifold (10), then to mid-stage duct (6), (9), left 8th stage bleed air duct (7), (8), regulated pressure elbow (4), (5), right 8th stage bleed air duct (1), (2), (3), starter duct (11), (15), anti ice duct (16), (18).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove warning notices.
(5)Remove safety clips and tags and close circuit breakers 3HA, 5HA, 7HA, 9HA, 11HA, 2HV, 4HV, 1HF, 4HF and 5HF (4HA, 6HA, 8HA, 10HA, 12HA).

ENGINE BLEED AIR SUPPLY SYSTEM - DUCTING - REMOVAL/INSTALLATION

1. Reason for the Job

A. Removal/installation of a duct or section of ducting in the wings.

B. Replacement in removed ducting of a duct, an O-ring or a flexible connector.

C. Removal/installation of bleed air precooler cold air inlet duct.

D. Removal/installation of wing-to-pylon connections.

E. Removal/installation of wing-to-fuselage feedthrough ducting.

F. Removal/installation of engine bleed air manifolds.

G. Removal/installation of thrust reverser pneumatic supply ducts.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT SYSTEM IS DEPRESSURIZED.

DISPLAY WARNING NOTICES PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.

DISPLAY WARNING NOTICES PROHIBITING ENGINE START-UP.

PLACE FLAP AND SLAT CONTROL LEVER IN FIRST NOTCH POSITION AND DISPLAY WARNING NOTICES PROHIBITING ITS OPERATION.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m to 4.5 m (8 ft. to 14 ft.)
B.	Torque Wrench 0 to 1.5 m.daN (0 to 130 lbf.in)
C.	Tab Washers
D.	Blanking Plugs/Caps
E.	Protective Covers
F.	Warning Notices
G. Material No. 04-007	Common Greases (Ref. 20-31-00)
H. Material No. 19-001	Wire, SS, Braided (Ref. 20-31-00)
J. 98A21003002000	Handle - Duct Extractor
Referenced Procedures	
R - 20-26-00, P. Block 1	Installation of Expansion Joints
- 36-22-12, P. Block 401	Overheat Sensing Element
- 36-11-00, P. Block 601	Engine Bleed Air Supply System
- 36-11-15, P. Block 401	Bleed Air Precooler
- 36-12-00, P. Block 401	APU Bleed Air Supply and Crossbleed Systems
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 78-31-05, P. Block 401	Pressure Regulating and Shut-Off Valve

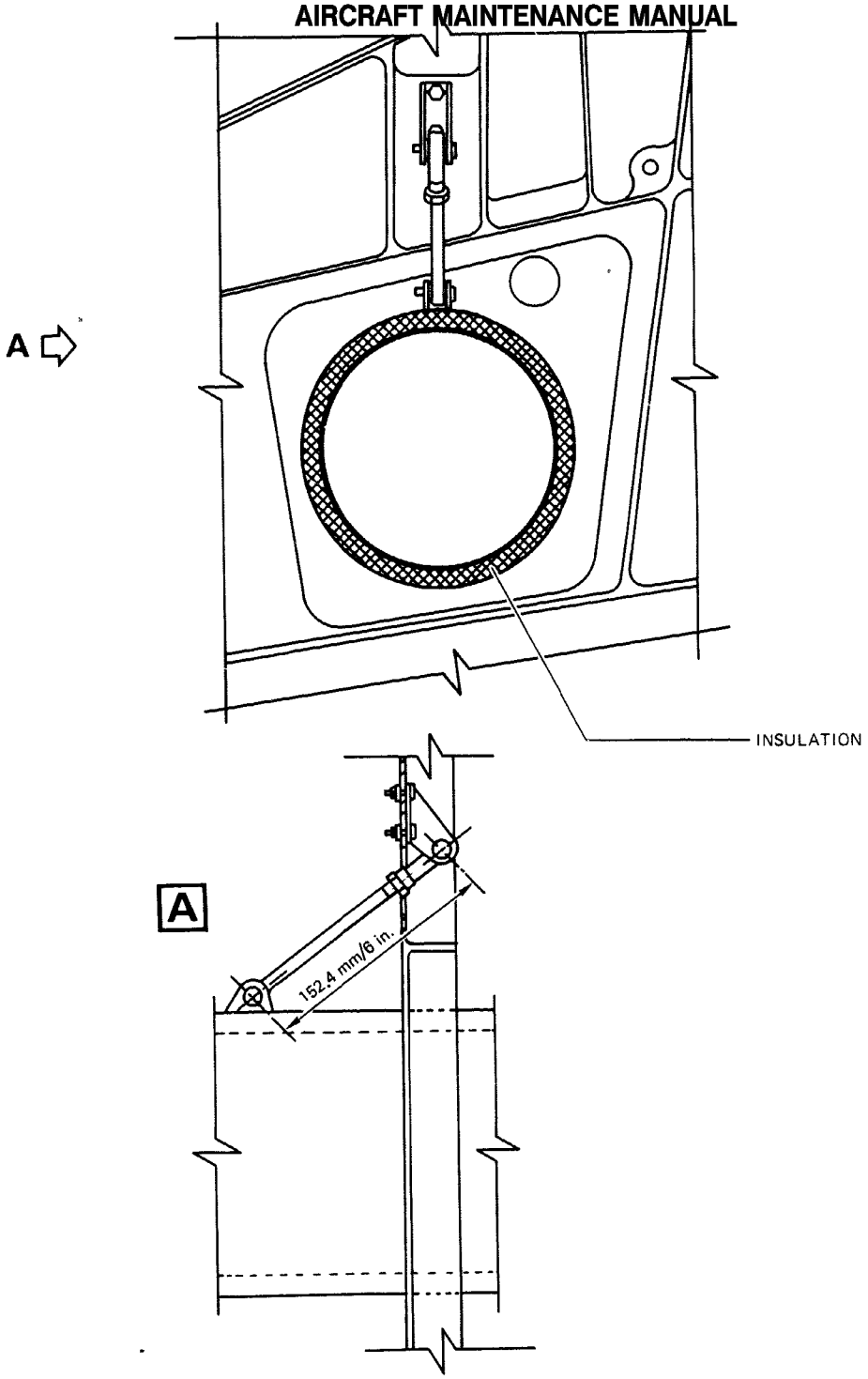
3. Removal/Installation of a Duct or Section of Ducting in the Wings
(Ref. Fig. 401)
(Ref. Fig. 402)
(Ref. Fig. 403)
NOTE : The HP air bleed ducts are interconnected :
- by clamps
- by flexible connectors.
This paragraph details typical removal/installation procedures for the components of the pneumatic system.
Removal of a duct connected at one or both ends by a flexible connector entails removal of ducting as far as the next clamp connection either at one side or at both sides of the duct.

To facilitate removal of ducts located in the wings, particularily of those routed through ribs, a duct upstream or downstream of the duct concerned, or if possible a duct located between two ribs, must first be removed.

A. Job Set-Up
(1)Position access platform.
(2)Open access doors 512AB to 523BB (612AB to 623BB).

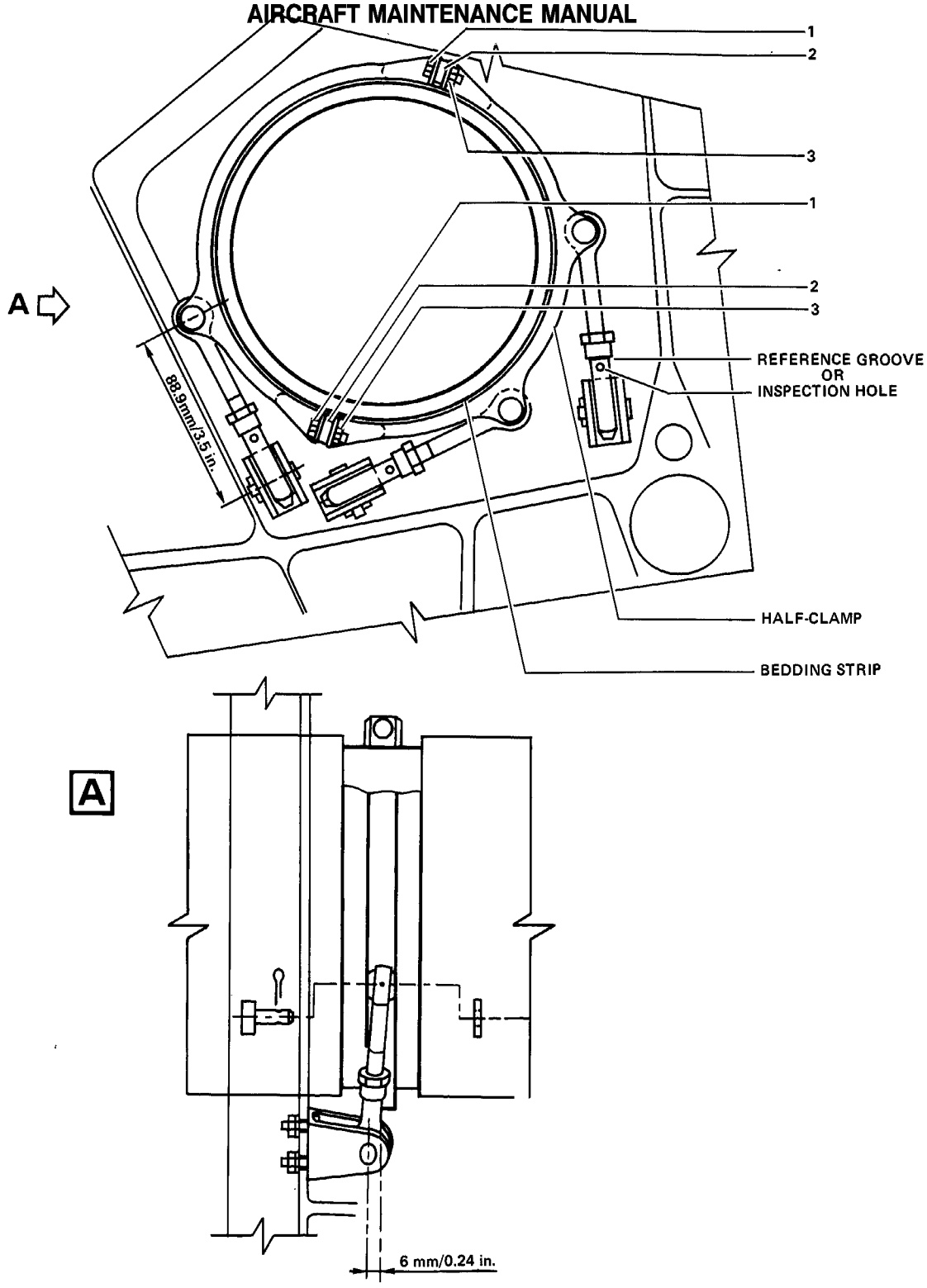
B. Removal
(1)Remove overheat sensing element (Ref. 36-22-12, P. Block 401).
NOTE : Take care not to damage sensing elements during work procedures.
(2)When necessary, remove cradles, shields and one or several wing ice protection supply lines.
(3)Disconnect any duct attachment fittings : brace links or structural support fittings, bonding strips.
(4)When necessary disconnect and cap associated pneumatic supply lines.
(5)When necessary remove deflectors and insulation muffs.
(6)Remove, when installed nuts (3), bolts (1), washers (2) and the two retaining half clamps and the bedding strip and retain for installation.
(7)Remove clamps connecting the duct or section of ducting and remove duct or ducting. Cap all open duct ends.

C. Replacement in Removed Ducting of a Duct, O-Ring or Flexible Connector
(1)Disassembly of flexible connector
R (Ref. Fig. 404)
R (a)Remove insulation muff (7).
R (b)Unlock and loosen locknut (6).
R (c)When necessary, disconnect bonding strip (1).
R (d)Remove bolt (2), nut (3) and washers (4) assemblies and remove links (5).
R (e)Separate male and female halves of connector.
R (f)Remove and discard seal(s) (8).
R NOTE : Take care not to damage seal retaining grooves.
R (2)Assembly of flexible connector
R (a)Clean and inspect both halves of connector ; in particular, seal bearing surfaces on male half which must be completely smooth.
R (b)Install seal(s) (8) in retaining grooves according to seal type



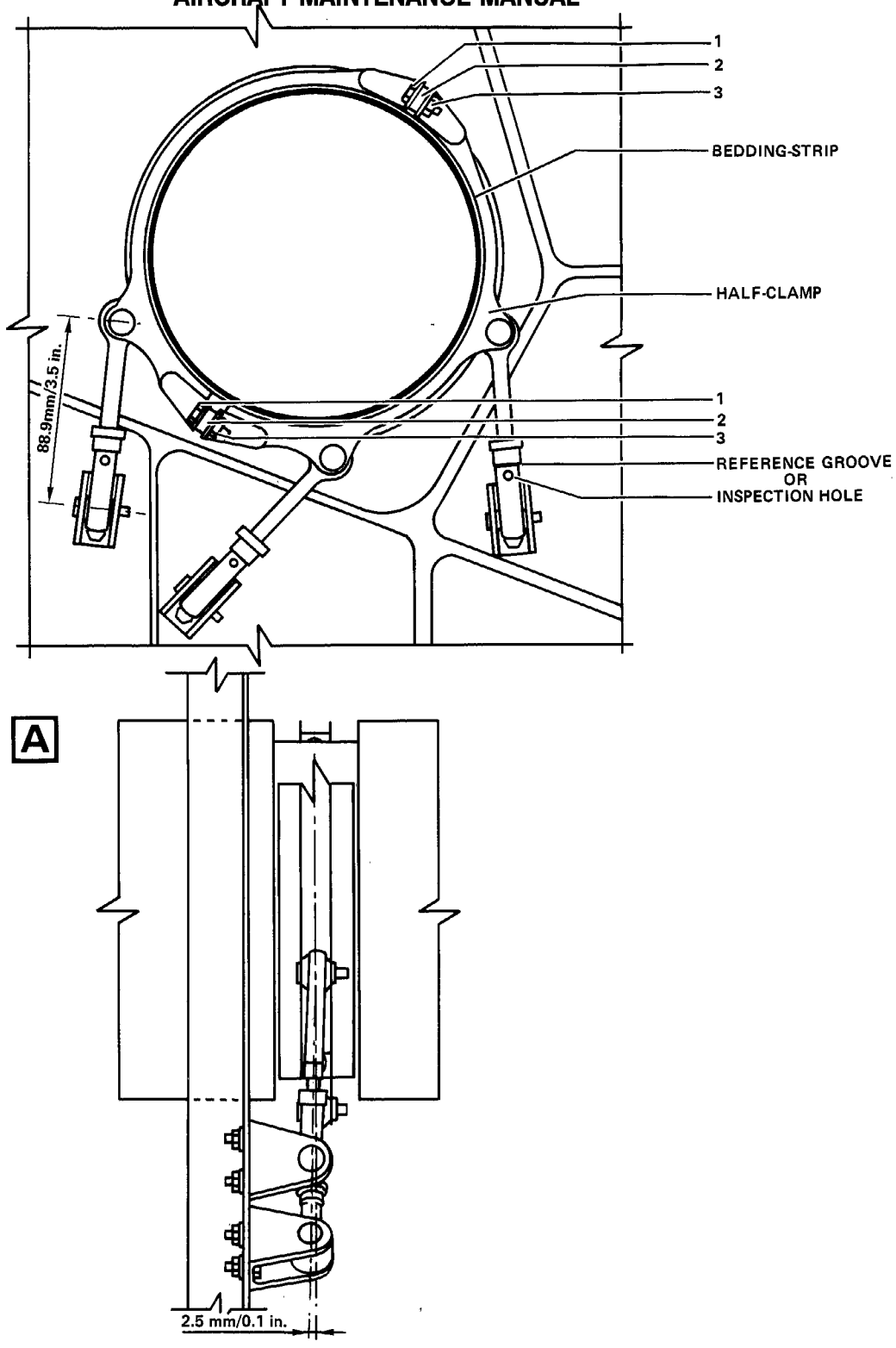
BM5 36 11 00 4 ANMO 06-01
DM5

Attachment of Ducting STA67/RIB2
Figure 401



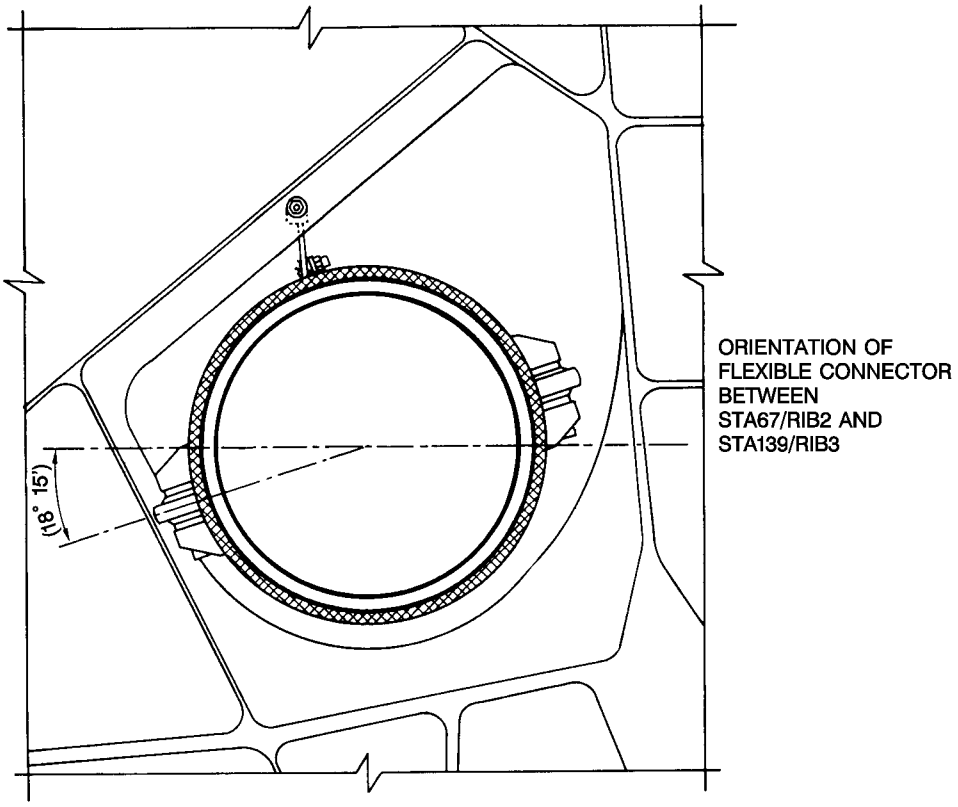
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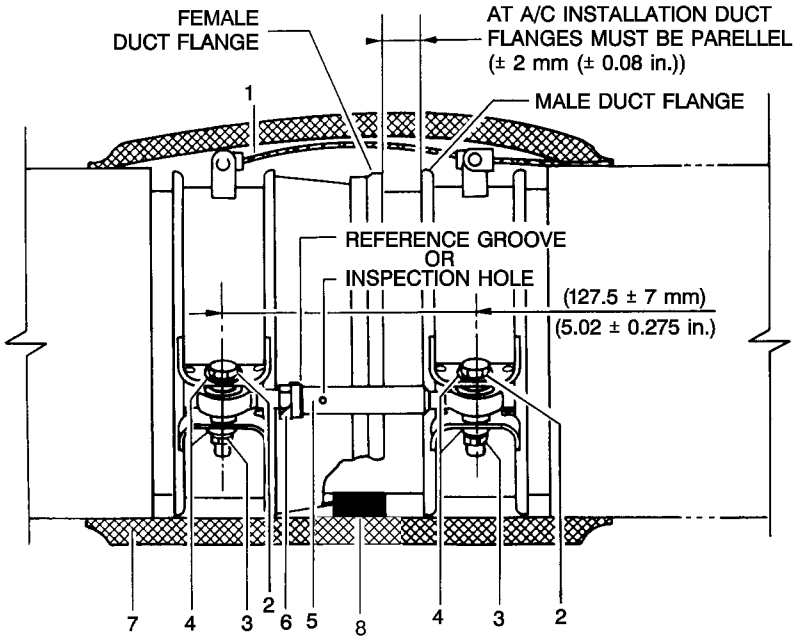
Attachment of Ducting STA139/RIB3
Figure 402



BM5 36 11 00 4 APMO - 18 - 13
DM5

Attachment of Ducting STA339/RIB6
Figure 403





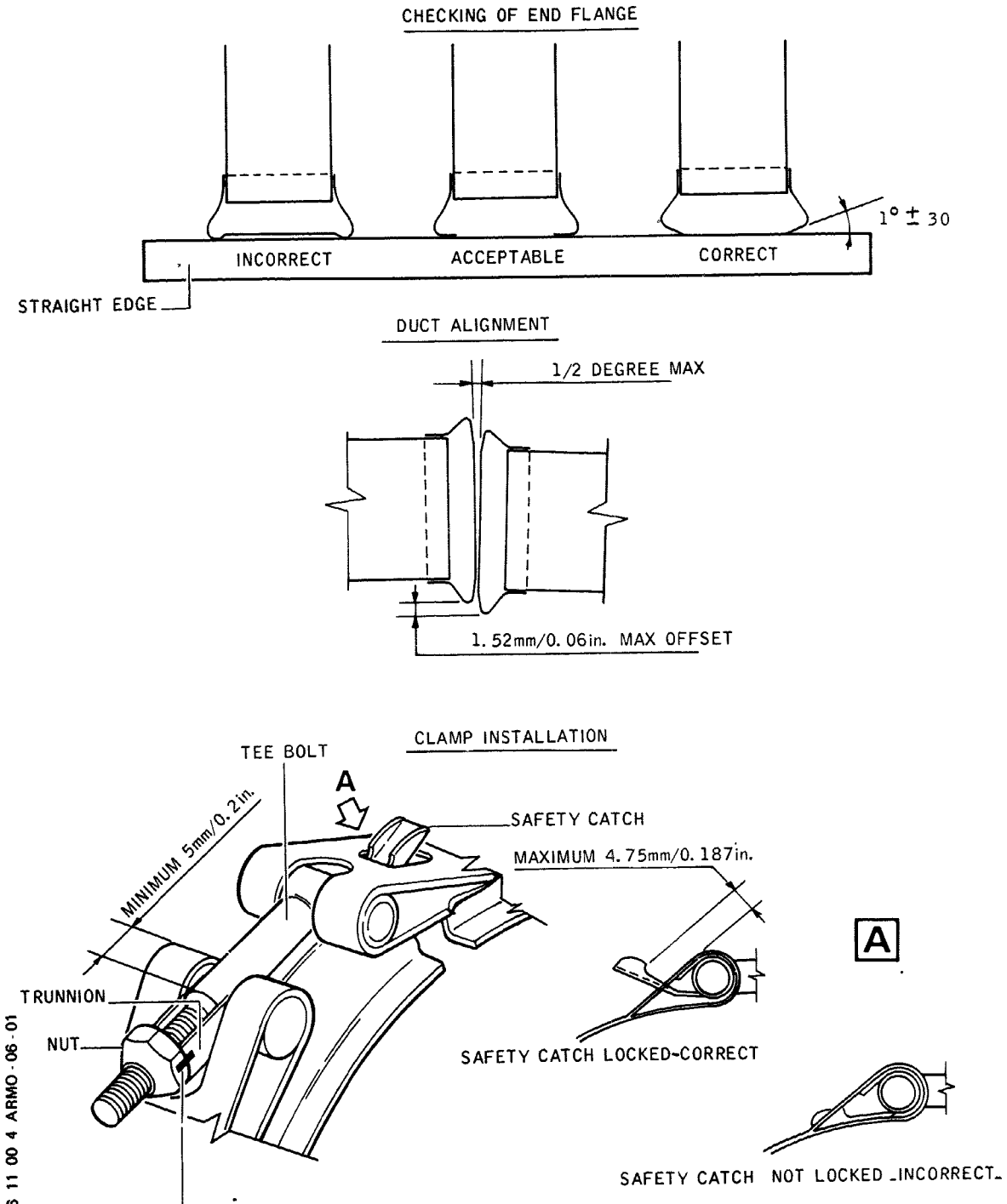
BM5 36 11 00 4 AQN0 00

Flexible Connector - Typical Installation and Adjustment
Figure 404

R

R (Ref. 20-26-00, P. Block 1).
R (c)Mate male and female halves of connectors, using a rotating movement
R with one half to avoid damaging seal.
R (d)Align terminals of bonding strip (1).
R (e)Install links (5) using bolt (2), nut (3) and washers (4) assemblies ;
R observe nominal dimension of 127.5 ±7 mm (5.02 ±0.275 in.). Tighten
R and safety locknut (6) on link (5).
R NOTE : - Make certain that threaded ends of links are visible through
R inspection holes or reference grooves are inside link bodies.
R - Make certain that duct flanges are parallel so as to ensure
R no angulation (a tolerance of ±2 mm (0.08 in.) throughout the
R whole circumference of the duct is accepted)
R (Ref. Fig. 404)
R (f)Connect bonding strip (1), if necessary.
R (g)Install insulation muff (7) :
R - For Velcro type, secure muff by pressing velcro strip together.
R - For Lace-up type, lace-up muff with Material No. 19-001.

D. Installation
(1)Remove all caps and protective covers.
(2)Check condition of duct flanges ; cleanliness, scoring, cracks or deformation.
(Ref. Fig. 405)
(3)Install bedding strip and the two half clamps. Install bolts (1), washers (2) and nuts (3) ; do not tighten at this stage to allow for correct positioning.
NOTE : Washers are installed between the two contact surfaces of the half clamps to enable correct tightening.
(4)Install duct or ducting ; remove bolts from flexible connector links where necessary to facilitate installation.
(5)Check that clamps are clean and in correct condition.
(6)Check that flanges mate with no undue stress ; slide open clamp over flanges and install tee bolt in trunnion.
(7)Connect any attaching items (brace links, structural support fittings).
(8)Position half clamps so as to allow installation of links and tighten bolt (1) and nut (3) assembly. Adjust thickness of washers (2) so that duct is held firmly without being crushed.
NOTE : Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies. If link adjustment was performed, replace tab washers and safety locknuts.
(Ref. Fig. 402, 403)
NOTE : - Check that attaching parts do not cause misalignment of ducts greater than 0.5 deg.
(offset must not exceed 1.52 mm (0.06 in.)).
- Check that the duct flanges of the male and female halves of the flexible connector are parallel (Ref. Fig.).
(9)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(10)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.



Clamp Installation and Duct Alignment
Figure 405

NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 405).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 405).
If either of these conditions is not met, discard clamp.

NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.

(11)Connect any previously removed associated pneumatic supply lines.

(12)On flexible connectors, check that on-center-distance between link attach fittings is 127.5 ±7 mm (5.02 ±0.275 in.). (Ref. Fig.) Adjust links (5) if necessary and safety link eyebolt locknut, making certain that eyebolt threads are visible through inspection hole or reference groove is inside link body.

NOTE : The distance between link attach fittings must be the same for both sides.

(13)Connect any previously removed bonding strips.

(14)Install previously removed ambient overheat sensing elements. (Ref. 36-22-12, P. Block 401).

(15)Install previously removed deflectors and insulation muffs :
- For Velcro type, secure muffs by pressing velcro strip together.
- For Lace-up type, lace-up muffs with Material No. 19-001.

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access doors 512AB to 523BB (612AB to 623BB).

(3)Remove access platform.

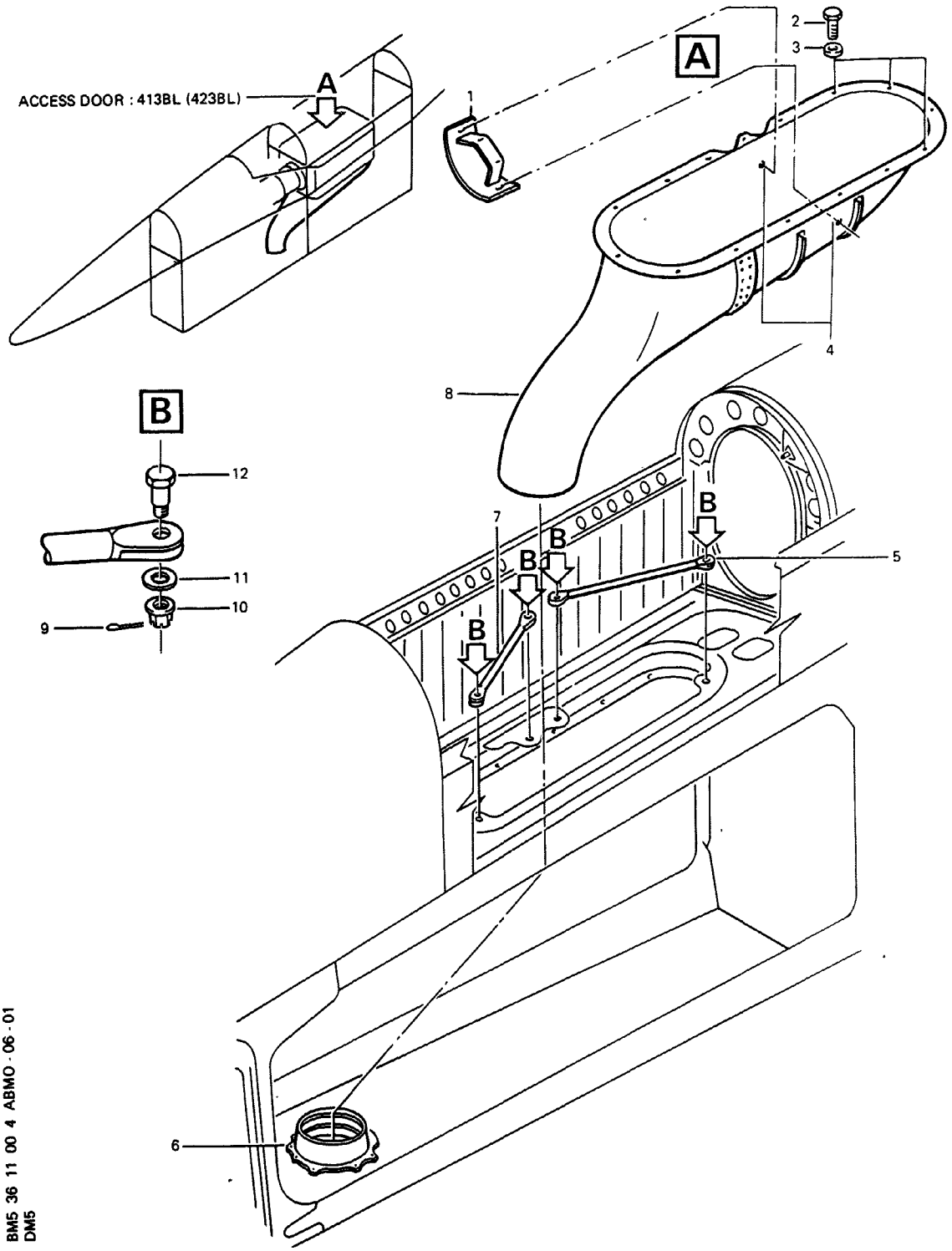
4. Removal/Installation of Bleed Air Precooler Cold Air Inlet Duct
(Ref. Fig. 406)

A. Job Set-Up
(1)Remove bleed air precooler (Ref. 36-11-15, P. Block 401).

B. Removal
NOTE : Place blanking plug in inlet duct to prevent tools or items of equipment from falling inside during removal procedures.
(1)Remove cotter pins (9), nuts (10), washers (11) and bolts (12) and remove rods (5) and (7).
(2)Remove screws (2) and washers (3) securing duct (8).
(3)Install extractor (1) on duct by means of captive nuts (4).
(4)Ease out duct (8) from sleeve (6) and remove duct.
(5)Install blanking cap on sleeve (6)

C. Installation
(1)Clean and inspect duct interface and/or adjacent area.
(2)Install extractor handle (1) on duct (8).
(3)Remove blanking cap from sleeve (6).
(4)Install blanking plug in duct (8) to prevent tools or items of equipment from falling inside the duct.
(5)Install duct (8) and check that if fits correctly in sleeve (6).
(6)Install screws (2) and washers (3) attaching duct to structure.
(7)Remove extractor handle (1).
(8)Install rods (5) and (7) and secure with screws (12), washers (11) and nuts (10).
(9)Install cotter pins (9).
(10)Remove blanking plug from duct (8).
(11)Install precooler (Ref. 36-11-15, P. Block 401).

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.



Air Inlet Duct
Figure 406

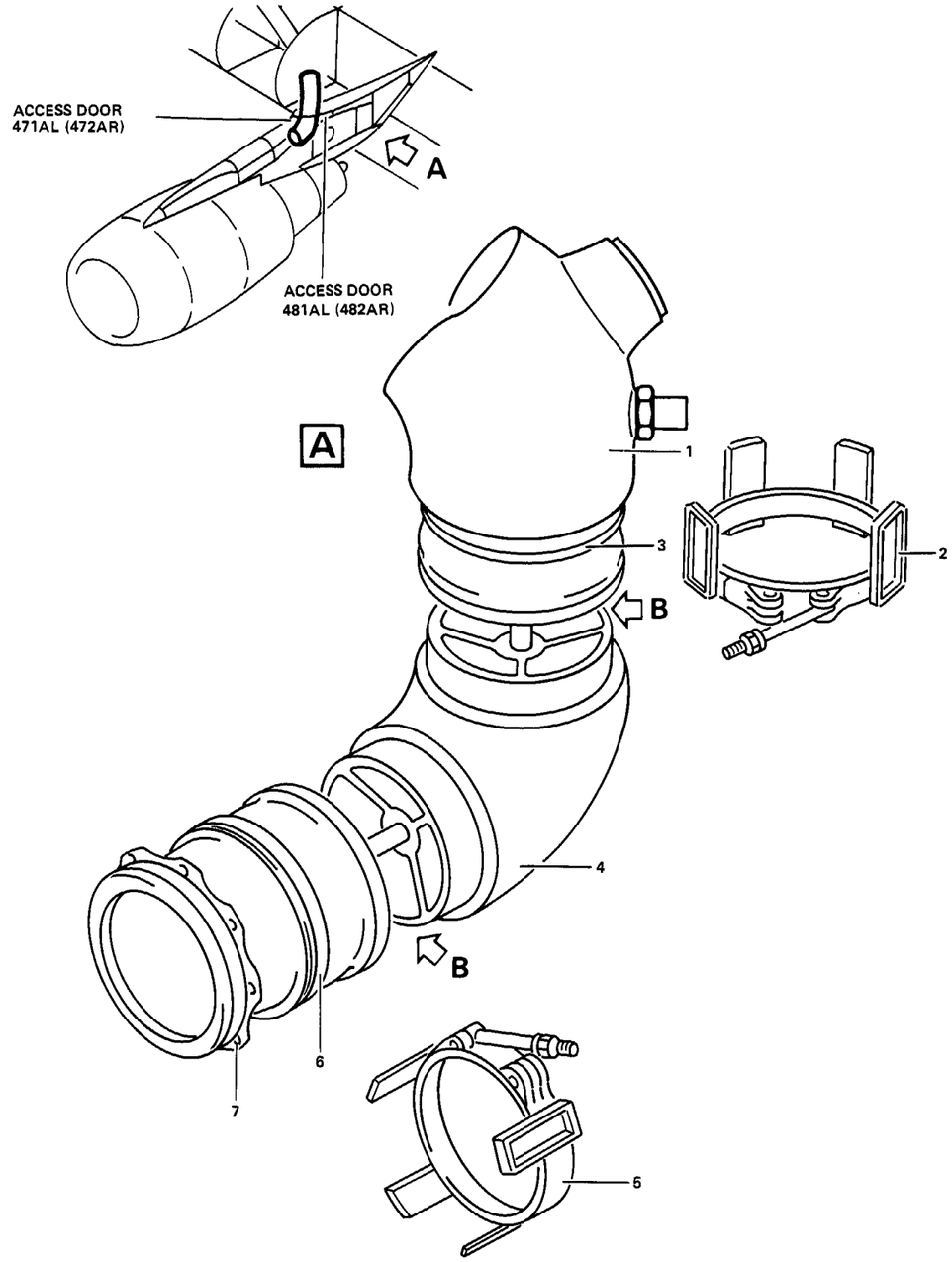
5. Removal/Installation of Wing-to-Pylon Connections
(Ref. Fig. 407)

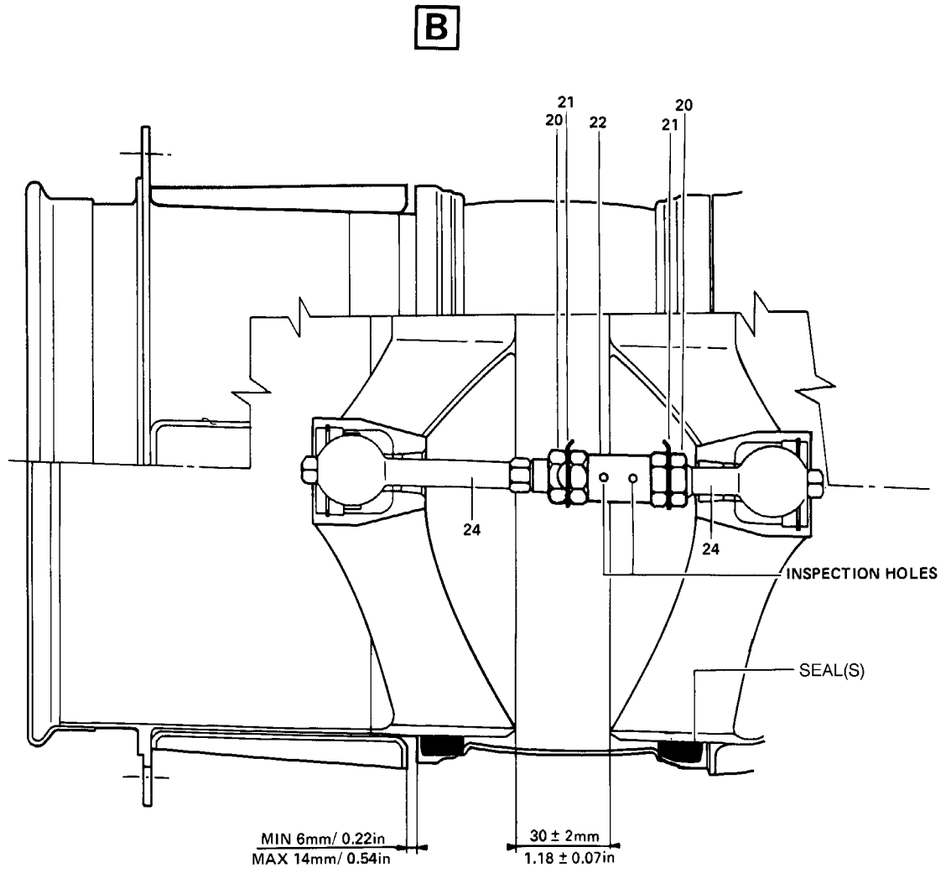
A. Job Set-Up
(1)Display relevant warning notices.
(2)Position access platform at access doors 472AR (482AR) and 471AL (481AL).
(3)Open access door 472AR (482AR).
(4)Open access door 471AL (481AL).

R B. Removal
R (1)Unlace and remove insulation muffs.
R (2)Remove the two clamps (2) and (5).
R (3)Slide sleeves (3) and (6) into the upper and lower ducts (1) and (7) respectively to gain access to the internal turnbuckle assembly.
R (4)On the internal turnbuckle assembly :
R - Unlock and loosen locking system : locknut (20) and tabwasher (21).
R - Separate spherical head rods (24) from threaded sleeves (22).
R - Discard tab washers (21).
R (5)Remove elbow duct (4) and cap all open duct ends.
R (6)Remove and check condition of sleeves (3) and (6).
R (7)Remove and discard seal(s).
R NOTE : Take care not to damage seal retaining grooves.

R C. Installation
R (1)Remove all blanking plugs/caps.
R (2)Check condition and clean duct ends, especially O-ring mating surfaces.
R (3)Install seal(s) (8) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1) (Ref. Fig. 407).
R (4)Install sleeves (3) and (6) on ducts (1) and (7).
R (5)Install elbow duct (4) between ducts (1) and (7).
R (6)Connect turnbuckle assembly :
R - Adjust spherical head rods (24) on threaded sleeves (22) to achieve a gap of 30 ±2 mm (1.18 ± 0.07 in.) between ducts.
R NOTE : Make certain that threads ends are visible through inspection holes or reference grooves are inside link bodies.
R (7)Tighten and safety locknuts (20) by bending washer tabs (21).
R (8)Slide sleeves (3) and (6) to come into contact with elbow ends.
R (9)Install lower clamps (5) to come into contact with bottom flange and upper clamp (2) to come into contact with top shoulder.
R (10)Check distance between clamp (5) hollow - pads and sleeve (6) flange. This should be between 6 and 14 mm (0.22 and 0.54 in.) (Ref. Fig. 407)
R (11)Install insulation muffs and lace up with Material No. 19-001.

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors 472AR (482AR) and 471AL (481AL).
(3)Remove access platform.
(4)Remove warning notices.





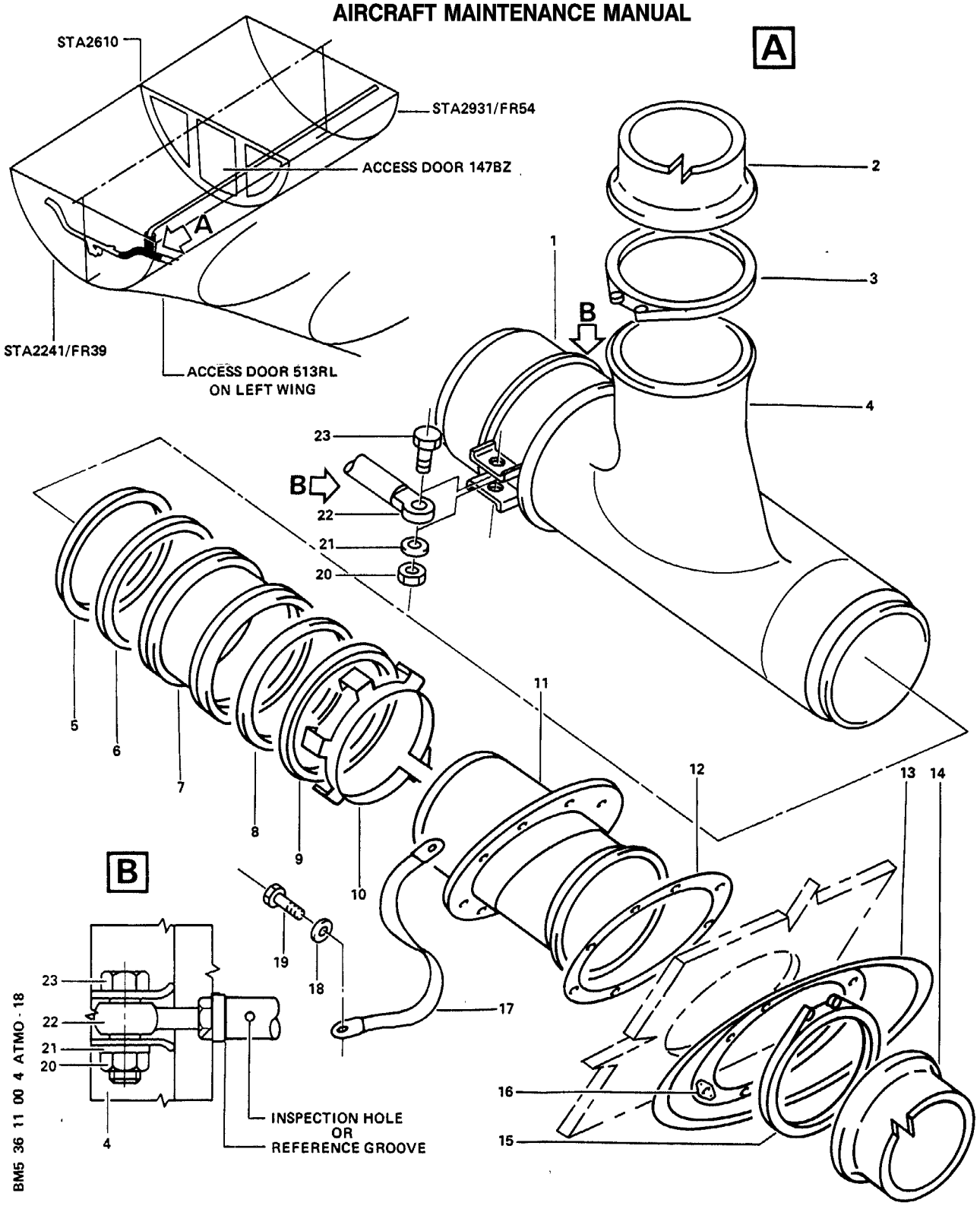
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Detail of Wing-to-Pylon Connection
Figure 407

6. Removal/Installation of Wing-to-Fuselage Feedthrough Ducting

A. Removal/Installation of Left Feedthrough.
(Ref. Fig. 408).

R (1)Job set-up
R (a)Display relevant warning notices.
R (b)Position access platform beside access door 513RL at wing/fuselage feedthrough, left side.
R (c)Open access door 513RL.
R (d)Open main gear doors (Ref. 32-12-11, P. Block 301).
R (e)Remove air conditioning compartment access door 147BZ.
R (2)Removal
R (a)Remove overheat sensing elements when necessary. (Ref. 36-22-12, P. Block 401).
R NOTE : If removal of sensing element is not required, take care not to damage element during work procedures.
R (b)On the wing side, remove clamp (15).
R (c)Loosen lock screw of clamp (10) to be able to slide coupling housing (7).
R (d)Remove bolts (23), washers (21) and nuts (20) and disconnect links (22) on tee duct (4) side.
R (e)Hold protective casing (13) on wing side and remove the 8 attachment screws (19) and washers (18) ; note location of screw securing bonding strip.
R (f)Hold tee duct (4) and remove clamp (3).
R (g)Slide tee duct (4) in order to free feedthrough (11) and pressure seal (12).
R (h)Free feedthrough (11) and pressure seal (12).
R (j)Install clamp (3) to hold tee duct (4) in position, but do not tighten at this stage.
R (k)Remove coupling housing (7).
R (l)Remove and discard seal(s) (5), (6), (8) and (9).
R (m)Cap open duct ends on tee duct (4).
R (n)Cap open ends of duct (14) in wing.
R (3)Installation
R (a)Install seal(s) (5), (6), (8) and (9) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1).
R (b)Check condition of pressure seal (12) and discard if necessary.
R (c)Check condition of feedthrough.
R 1 Check for correct condition of flange (Ref. Fig. 405).
R 2 Check that seal contact surfaces are smooth and free from scoring.
R 3 Check for absence of cracks or signs of fracture around attachment flange.
R 4 Check condition of captive nuts (16).
R (d)Remove blanking plugs/caps from duct (14).
R (e)Hold tee duct (4) and remove clamp (3).
R (f)Insert feedthrough (11) in housing by sliding (7) and (4) and position pressure seal (12) correctly. Install clamp (3) but do not tighten at this stage.
R (g)Install protective casing (13) on feedthrough (11) and install clamp (15) but do not tighten at this stage.



Wing-to-Fuselage Feedthrough - Left Side
Figure 408

(h)Install links (22) and secure with bolts (23), washers (21) and nuts (20).
NOTE : Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies.
(j)Install attachment screws (19) and washers (18) securing feedthrough (11) to protective casing (13), but do not tighten at this stage.
(k)Correctly position all items already installed. Tighten and safety the 8 screws (19) securing feedthrough to protective casing (13). Connect bonding strip (17) at location noted during removal.
(l)TORQUE clamp (15) to value given on clamp.
(m)Make certain that no tool or item of equipment has been left in wing. Close access door 513RL.
(n)TORQUE clamp (3) to value given on clamp.
(o)Correctly position coupling housing (7) and tighten lockscrew (10) of retaining clamp.
(p)Install any sensing elements previously removed (Ref. 36-22-12, P. Block 401).

(4)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (b)Install access door.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE
R CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE
R THE ACCESS DOORS/PANELS AT FR47.
R 1 Install air conditioning compartment access door 147BZ.
(c)Close main gear doors (Ref. 32-12-11, P. Block 301).
(d)Remove access platform.
(e)Remove warning notices.

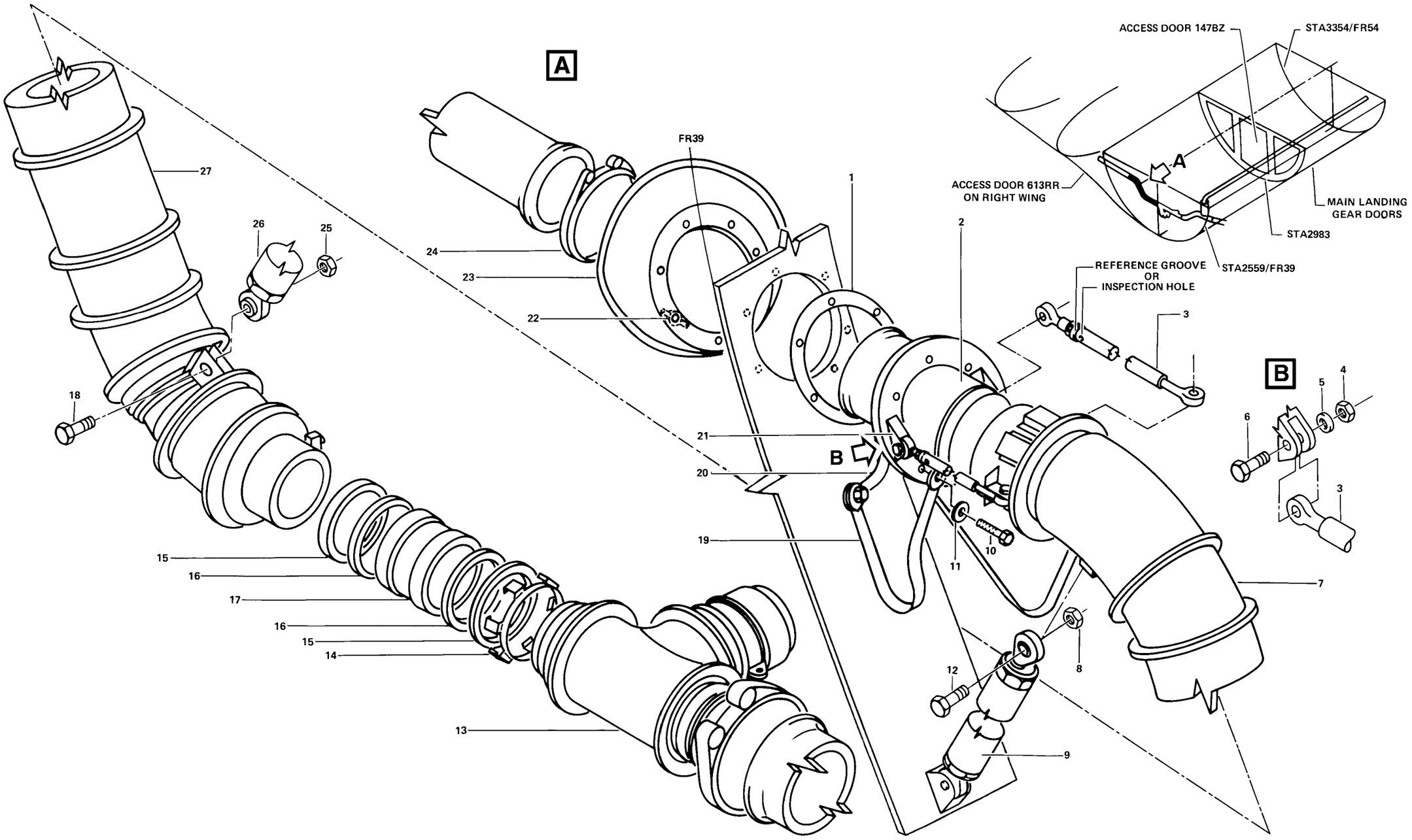
B. Removal/Installation of Right Feedthrough
(Ref. Fig. 409)

(1)Job set-up
(a)Display relevant warning notices.
(b)Position access platform beside access door 613RR at wing-to-fuselage feedthrough, right side.
(c)Open access door 613RR.
(d)Open main gear doors (Ref. 32-12-11, P. Block 301).
(e)Remove air conditioning compartment access door 147BZ.

(2)Removal
(a)Remove overheat sensing elements when necessary (Ref. 36-22-12, P. Block 401).
NOTE : If removal of sensing element is not required, take care not to damage element during work procedures.
(b)Remove tee duct (13) next to crossfeed valve (Ref. 36-12-00, P. Block 401) to gain access to item to be removed.
(c)Remove coupling housing (17).
(d)Remove and discard seal(s) (15) and (16).
NOTE : Take care not to damage seal retaining grooves.
(e)Remove nuts (4), washers (5) and bolts (6) and remove links (3) from support fittings (21).
(f)Remove bonding strips (19) and (20), duct side.

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Wing-to-Fuselage Feedthrough - Right Side
Figure 409

R

(g)Hold duct (27) and remove nut (8), bolt (12) and remove link (9) on duct side.
(h)Remove nut (25), bolt (18), link (26) on duct side and remove duct (27).
(j)In wing, remove clamp (24).
(k)Note location of link support fittings (21) on feedthrough flange (2) and position of feedthrough (2).
(l)Hold protective casing (23) on wing side, and remove feedthrough (2) attachment screws (10) and washers (11).
(m)Remove feedthrough (2) and pressure seal (1) and check for correct condition.
On feedthrough :
1 Check for correct condition of flange. (Ref. Fig. 405)
2 Check that seal contact surfaces are smooth and free from scoring.
3 Check for absence of cracks or signs of fracture around attachment flange.
4 Check for condition of captive nuts (22).
(n)Cap open end of duct in wing.

(3)Installation
(a)Check condition of pressure seal (1) and discard if necessary.
(b)Install seal(s) (15) and (16) in retaining grooves of housing (17) according to seal type (Ref. 20-26-00, P. Block 1).
NOTE : Seals bearing surface must be smooth and free from major scoring.
(c)Remove blanking cap of duct in wing.
(d)Install feedthrough (2) and pressure seal (1), without tightening screws (10), on protective casing (23) and secure with captive nuts (22). Do not forget to position link support fittings (21) in previously noted location. Connect bonding strip (20).
(e)Install protective casing (23) on freedthrough (2) and install clamp (24) in wing ; do not tighten at this stage.
(f)Install bonding strip (19) ; Tighten and safety screws (10).
(g)TORQUE clamp (24) in wing to the value given on clamp.
clamp (24) in wing to the value given on clamp.
(h)Make certain that no tools or items of equipment have been left in the wing and close access door 613RR.
(j)Remove blanking plugs/caps from duct (27).
(k)Position duct (27) on feedthrough (2) and install link (9), bolt (12) and nut (8) ; Tighten nut (8).
(l)Install link (26), bolt (18) and nut (25) ; Tighten nut (25).
link (26), bolt (18) and nut (25) ; Tighten nut (25).
(m)Install links (3) on support fittings (21) ; Install bolts (6), washers (5) and nuts (4) ; Tighten nuts (4).
NOTE : Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies.
(n)Install tee duct (13) next to crossfeed valve (Ref. 36-12-00, P. Block 401).
(o)Install any previously removed overheat sensing elements on this section of ducting (Ref. 36-22-12, P. Block 401).

(4)Close-up
(a)Make certain that working area is clean and clear of tools and

miscellaneous items of equipment.

R (b)Close access door.

R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE
R CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE
R THE ACCESS DOORS/PANELS AT FR47.

R 1 Close air conditioning compartment access door 147BZ.

(c)Close main gear doors (Ref. 32-12-11, P. Block 301).

(d)Remove access platform.

(e)Remove warning notices.

7. Removal/Installation of Engine Bleed Air Manifolds

A. General

(1) This procedure provides instructions for removal and installation of the bleed air manifolds.

(2) Access to the manifolds is through the thrust reverser doors. For thrust reverser door opening and closing procedures (Ref. 71-13-00, P. Block 301).

(3) For information related to Inspection/Check of hoses, tubes and ducts (Ref. 36-11-00, P. Block 601).

NOTE : To facilitate removal/installation operations, it is recommended to loosen all junction couplings between ducts and between valves and ducts.

B. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m (8 ft.)
B.	Torque Wrench - 50 to 125 lbf. in. (0.56 to 1.41 m.daN)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	Warning Notices
F. RSE1202	Spanner Set
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-12, P. Block 401	HP Valve
- 36-11-13, P. Block 401	IP Check Valve
- 36-11-14, P. Block 401	Bleed Valve
- 36-11-00, P. Block 601	Engine Bleed Air Supply System
- 78-31-05, P. Block 401	Pressure Regulating and Shut-off Valve

C. Job Set-Up

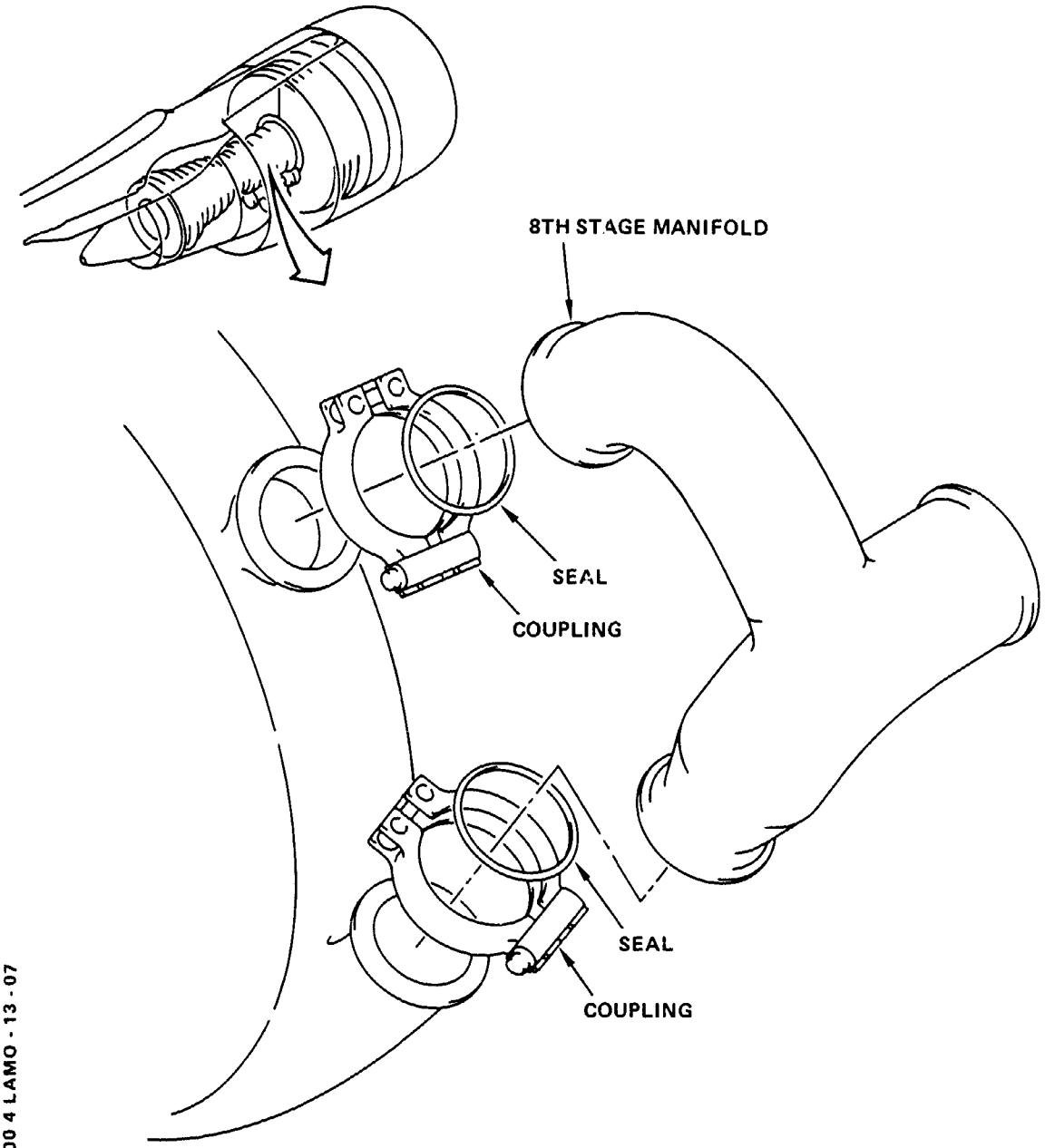
(1) Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED & COMPT TEMP/ENG 1 CONTROLLER/ MONITOR	5HA	209/A17
22VU	AIR BLEED & COMPT TEMP/ENG 1 CONTROLLER/ CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG 1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/VALVES/ENG 1 VALVES/BLEED	11HA	311/H54
131VU	AIR BLEED & COMPT TEMP/ENG 2/VALVES/ BLEED	12HA	311/H55
131VU	AIR BLEED & COMPT TEMP/ENG 2/VALVES/ HP	4HA	312/G53
131VU	AIR BLEED & COMPT TEMP/ENG 2/WARN	10HA	312/G54

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/ENG 2 CONTROLLER/ CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG 2/CONTROLLER	6HA	315/D54

(2)Open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(3)Install access platform.

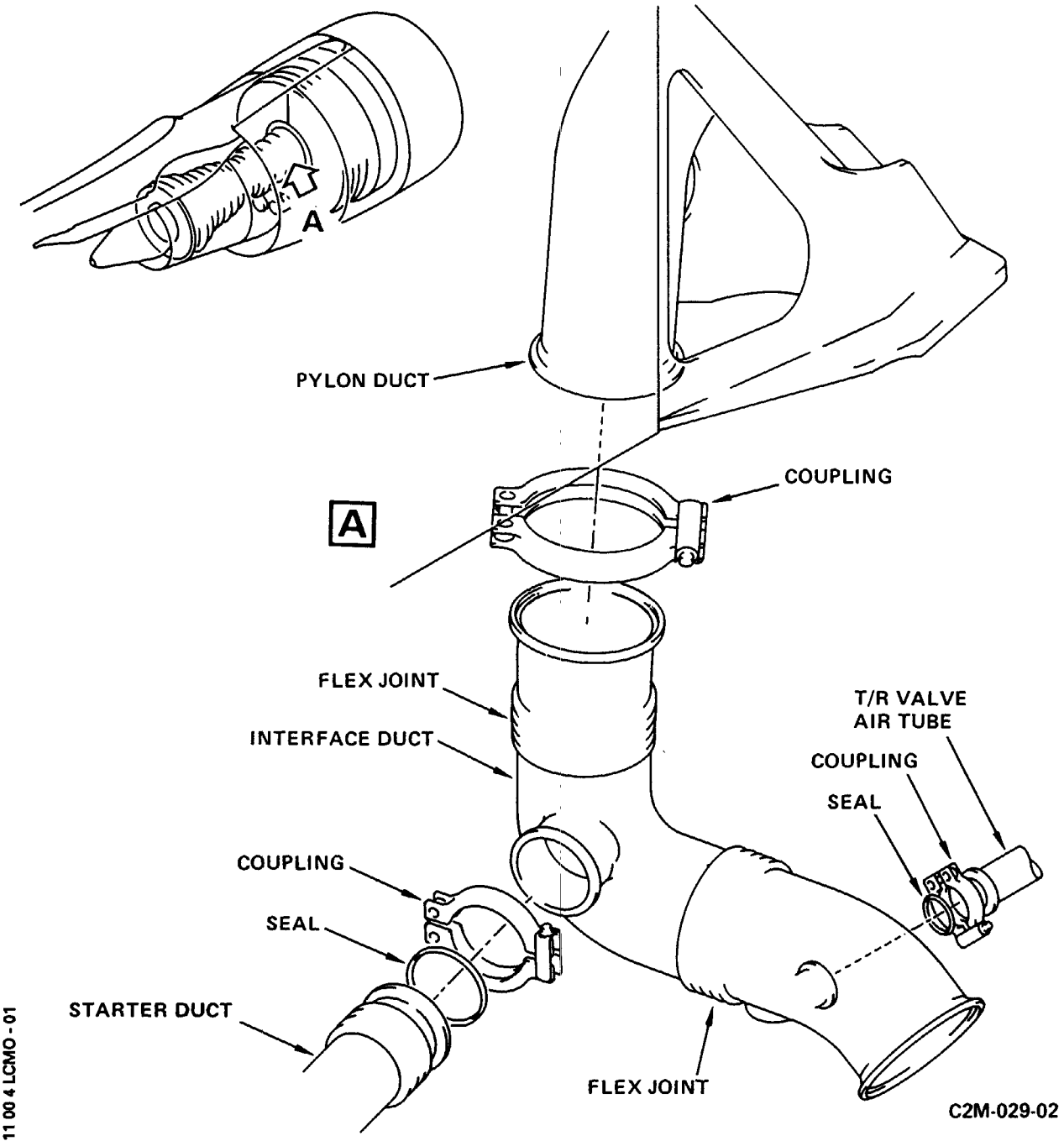
D. Removal
(Ref. Fig. 410)
(Ref. Fig. 411)
(Ref. Fig. 412)
(Ref. Fig. 413)
(Ref. Fig. 414)
(1)Remove the couplings and seals that connect the T/R valve air tubes to the interface duct and the intersect duct.
(2)Loosen the couplings that connect the T/R valve air tubes to the ground (Y) - check valve. Turn the T/R valve air tubes away from the bleed air manifolds for clearance.
(3)Remove the IP check valve (Ref. 36-11-13, P. Block 401).
(4)Pre GE SB 71-062 *** (ENGINES WITH THE ONE-PIECE TOLERANCE TAKE-UP DUCT)
(a)Disconnect the sense line from the tolerance take-up duct.
(5)Post GE SB 71-062 *** (ENGINES WITH TWO-PIECE TOLERANCE TAKE-UP DUCT)
(a)Disconnect the sense line from the adapter.
(6)Remove the HP valve (Ref. 36-11-12, P. Block 401).
(7)Remove, with its seal, the coupling that connects the intersect duct to the tolerance take-up duct.
Remove the tolerance take-up duct.
(8)Remove, with its seal, the coupling that connects the starter duct to the interface duct.
(9)Remove the bleed valve (Ref. 36-11-14, P. Block 401).
(10)Remove the bolts, washers and nuts that attach the support links to the intersect duct. Remove the intersect duct.
(11)Remove the couplings and seals that connect the interface duct to the pylon duct and the bleed valve. Remove the interface duct.
(12)Remove the couplings and seals that connect the 8th-stage manifold to the engine ports. Remove the 8th-stage manifold.
(13)Remove the hydraulic pressurization hose from the 14th-stage manifold (Engine No. 1 only).
(14)Remove the couplings and seals that connect the 14th-stage manifold to the engine ports. Remove the 14th-stage manifold.
(15)Put caps on open duct ends and open engine ports.
(16)Examine the couplings :
(a)Turn the coupling nuts with a torque wrench. If a nut turns with less than 6 lbf.in. (0.068 m.daN) torque, replace the nut or the coupling.
(b)Do a visual inspection of the couplings for scores, cracks, unusual wear and unusual bolt thread and nut conditions. Repair or replace unserviceable couplings.



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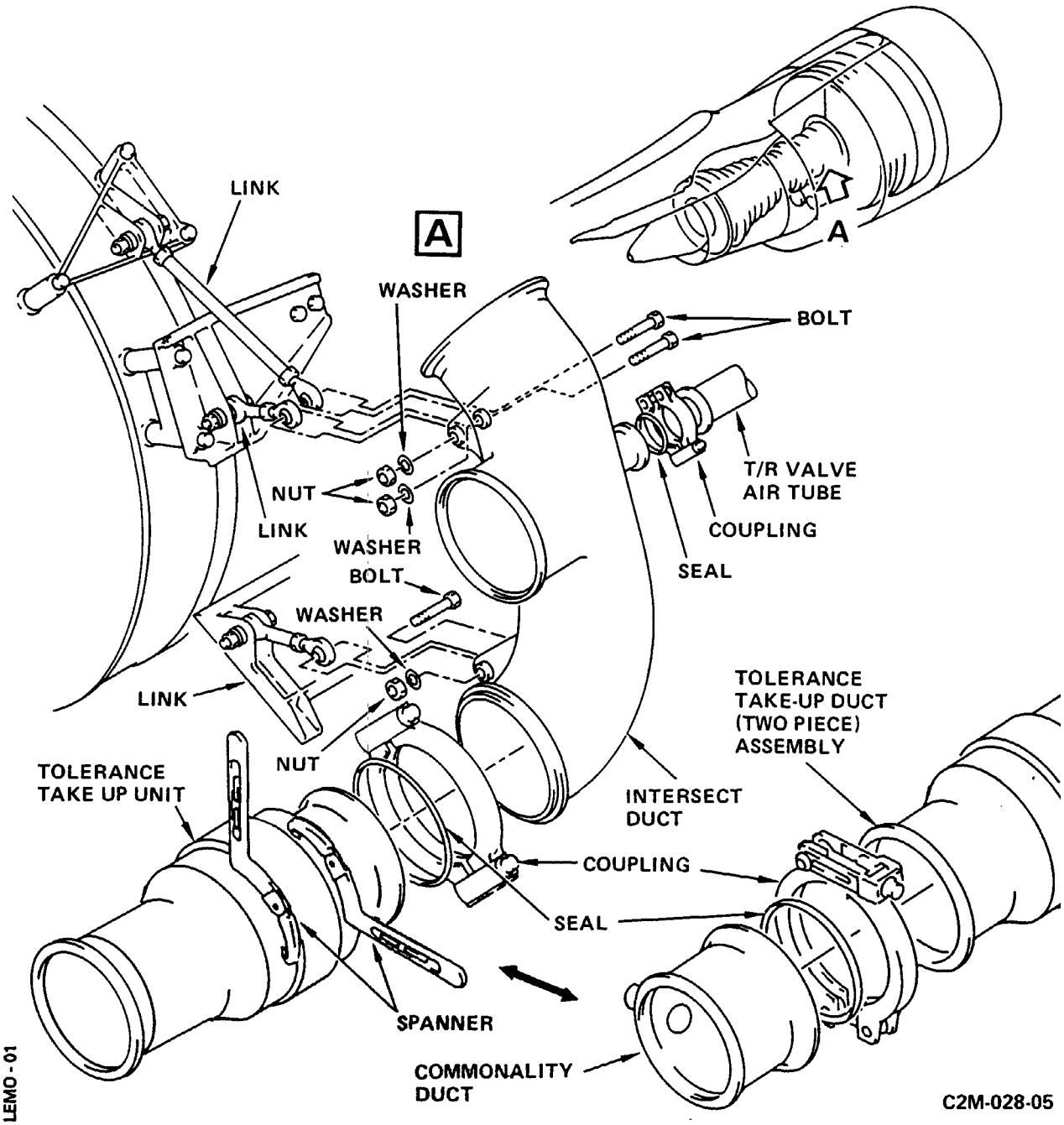
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8th Stage Manifold
Figure 410

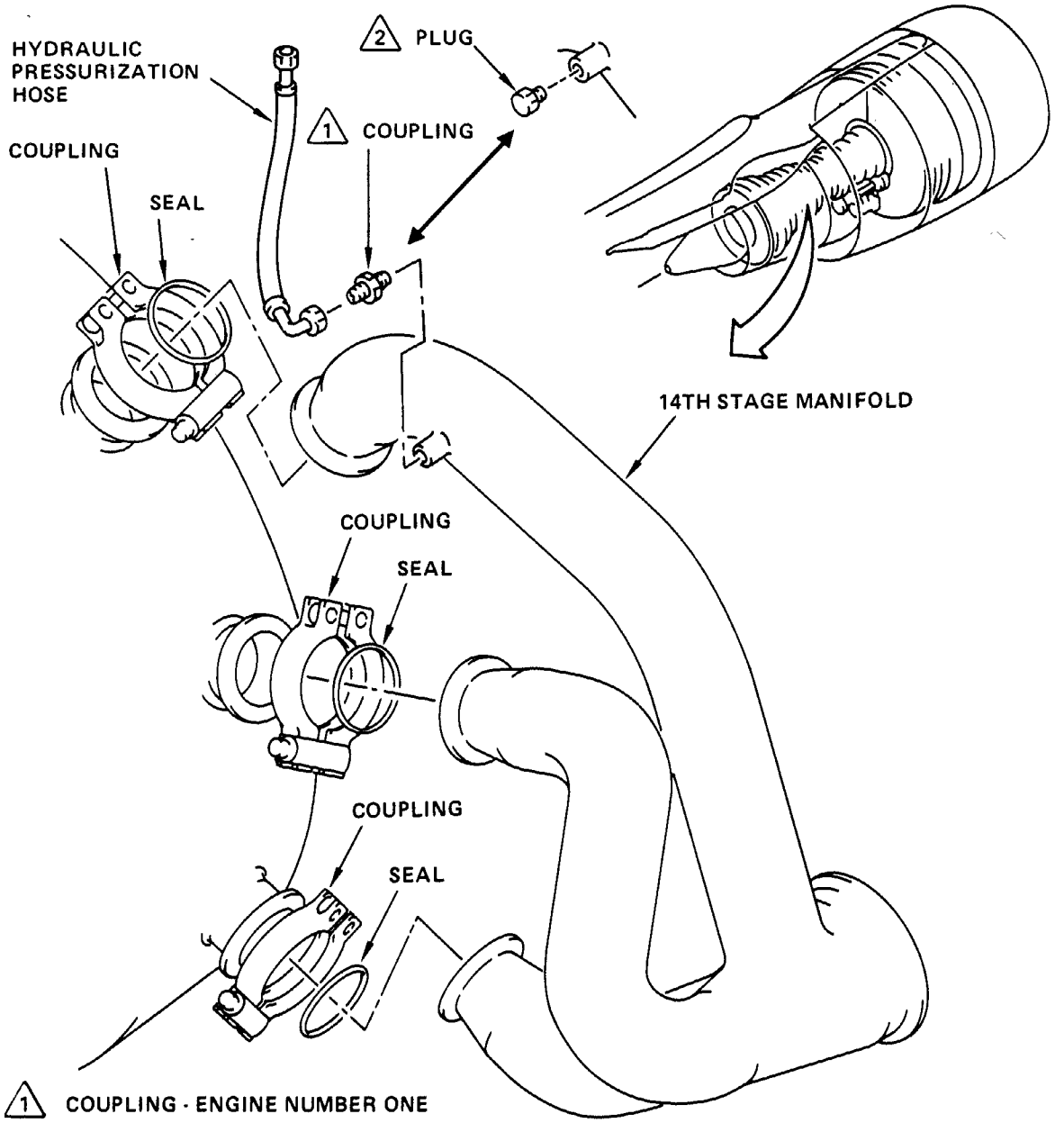


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Interface Duct
Figure 411



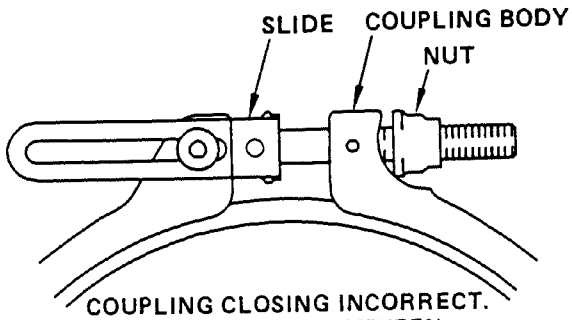
Intersect Manifold and Tolerance Take-Up Unit
Figure 412



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14th Stage Manifold
Figure 413

INCORRECT

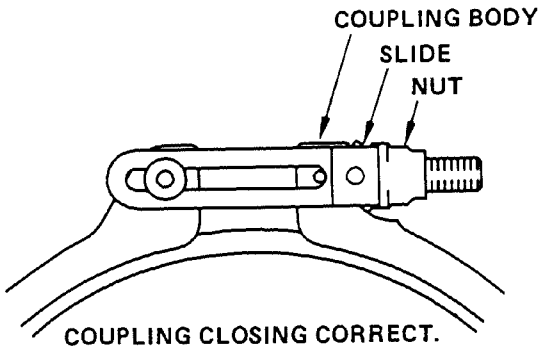


COUPLING CLOSING INCORRECT.
(SLIDE END IS NOT BETWEEN
COUPLING BODY AND NUT)

CAUTION

INCORRECT CLOSURE WILL RESULT
IN COUPLING FAILURE.

CORRECT



COUPLING CLOSING CORRECT.
(SLIDE END BETWEEN COUPLING
AND NUT)

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Duct Coupling Installation Caution
Figure 414

E. Installation (Ref. Fig. 410, 411, 412)
(Ref. Fig. 413)

NOTE : Do a visual inspection of all seals before installation.

(1)Remove the caps from the ducts, valves and engine ports.

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF YOU DO NOT CLOSE THE COUPLING CORRECTLY, IT WILL CAUSE THE COUPLING TO BECOME DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

(2)Attach the 8th-stage manifold to the engine ports with the couplings and seals.

(3)TORQUE the couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the couplings lightly. TORQUE and lightly hit the couplings two more times. TORQUE the couplings to the specified value.

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF YOU DO NOT CLOSE THE COUPLING CORRECTLY, IT WILL CAUSE THE COUPLING TO BECOME DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

R (4)Check of alignment of the 14th stage manifold.

R CAUTION : MAKE SURE THE ALIGNMENT OF THE 14TH STAGE MANIFOLD TO THE ENGINE PORTS BEFORE INSTALLATION. IF THE 14TH STAGE MANIFOLD IS NOT WITH IN THE ALIGNMENT TOLERANCE IT CAN CAUSE A PRELOAD CONDITION. THE PRELOAD CONDITION CAN CAUSE CLAMP FAILURE.

R (a)Check the 14th stage manifold alignment with the engine ports before installation (Refer to 36-11-00, P. Block 601).

R (5)Attach the 14th-stage manifold to the engine ports with the couplings and seals.

R (6)TORQUE the couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the couplings lightly. TORQUE and lightly hit the couplings two more times. TORQUE the couplings to the specified value.

R (7)Install the hydraulic pressurization hose on the 14th-stage manifold (Engine No. 1 only). TORQUE the fitting to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN).

NOTE : The hydraulic tank pressurization port on the 14th-stage manifold is not used for the number two engine position. Install the cap on the port.

NOTE : Do a visual inspection of all pilots for damage before installation.

R (8)Install the IP check valve (Ref. 36-11-13, P. Block 401).

R (9)Install the HP valve (Ref. 36-11-12, P. Block 401).

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF YOU DO NOT CLOSE THE COUPLING CORRECTLY, IT WILL CAUSE THE COUPLING TO BECOME DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

R (10)Connect the intersect duct to the IP check valve with the coupling and

seal. Align the index arrow on the duct with the flow arrow on the check valve to 0.06 in. (1.5 mm) or less. Do not torque the coupling.

R (11)Install the bleed valve (Ref. 36-11-14, P. Block 401).

R (12)Attach the links to the intersect duct with the bolts, washers and nuts. Do not torque the nuts at this time. Adjust the links as necessary to get a neutral fit (no preload). TORQUE the link attach bolts to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

R (13)TORQUE the link jamnuts to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN) and safety the links with safety-wire.

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF YOU DO NOT CLOSE THE COUPLING CORRECTLY, IT WILL CAUSE THE COUPLING TO BECOME DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

R (14)Install the tolerance take-up duct.

(a)Pre GE SB 71-062 *** (ENGINES WITH THE ONE-PIECE TOLERANCE TAKE-UP DUCT)

1 Cut the safety-wire and make the length of the duct shorter. Use two spanner wrenches and turn the collar.

2 Connect the tolerance take-up duct to the HP valve with the seal and coupling. Do not torque the coupling at this time.

3 Turn the duct to align it with the sense line. Connect the sense line to the duct. TORQUE the coupling nut to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).

4 TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

CAUTION : WHEN THE TOLERANCE TAKE-UP DUCT IS ADJUSTED, DO NOT EXTEND THE UNIT TO THE POINT THAT THREADS ARE SEEN. IF THE DUCT IS EXTENDED TOO FAR, THE DUCT WILL BE DAMAGED.
THERE ARE TWO MANUFACTURERS OF THE TOLERANCE TAKE-UP UNIT (TTU).
- THE ARROWHEAD TTU USES INTERNAL STOPS, DO NOT EXTEND THE DUCT TO THE POINT THAT THREADS ARE SEEN. THIS WILL DAMAGE THE DUCT.
- THE EXOTIC METALS TTU USES EXTERNAL STOPS AND THREADS CAN BE SEEN. DO NOT EXTEND THE DUCT MORE THAN THE STOPS. THIS WILL DAMAGE THE DUCT.

5 Extend the tolerance take-up duct with two spanner wrenches until the duct flanges touch all along the flange surfaces.

6 Connect the tolerance take-up duct to the intersect duct with a seal and coupling.

7 TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

(b)Post GE SB 71-062 *** (ENGINES WITH THE TWO-PIECE TOLERANCE TAKE-UP DUCT)

1 Cut the safety-wire and make the length of the duct shorter.

Use two spanner wrenches and turn the collar.

2 Connect the tolerance take-up duct adapter to the HP valve with the seal and coupling. Do not torque the coupling at this time.

3 Turn the adapter to align it with the sense line. Connect the sense line to the adapter. TORQUE the sense line coupling to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).

4 TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

5 Use the arrows to align the initial position of the tolerance take-up duct to the intersect duct.

6 Connect the tolerance take-up duct to the intersect duct with a seal and coupling.

NOTE : The tolerance take-up duct is canted at 5 degrees. Make sure that when the duct is installed, the offset aligns with the curvature of the system.

7 Extend the tolerance take-up duct with two spanner wrenches until the duct aft flange and the adapter duct flange touch all along the flange surfaces. Lightly hit the duct with a non-marring hammer to get the ducts to align correctly.

8 Connect the tolerance take-up duct to the adapter with a seal and coupling.

9 TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

R (15)Remove the coupling that attaches the IP check valve to the intersect duct.

R (16)Do an inspection of the clearance between the IP check valve and the intersect duct.

(a)A clearance of up to 0.035 in. (0.89 mm) is an indication that there is no preload and the assembly is serviceable. Safety the adjustment rings on the tolerance take-up duct with safety-wire.

CAUTION : WHEN THE TOLERANCE TAKE-UP DUCT IS ADJUSTED, DO NOT EXTEND THE UNIT TO THE POINT THAT THREADS ARE SEEN. IF THE DUCT IS EXTENDED TOO FAR, THE DUCT WILL BE DAMAGED.
THERE ARE TWO MANUFACTURERS OF THE TOLERANCE TAKE-UP UNIT (TTU).
- THE ARROWHEAD TTU USES INTERNAL STOPS, DO NOT EXTEND THE DUCT TO THE POINT THAT THREADS ARE SEEN. THIS WILL DAMAGE THE DUCT.
- THE EXOTIC METALS TTU USES EXTERNAL STOPS AND THREADS CAN BE SEEN. DO NOT EXTEND THE DUCT MORE THAN THE STOPS. THIS WILL DAMAGE THE DUCT.

(b)A clearance of more than 0.035 in. (0.89 mm) is an indication that there is preload and the assembly is unserviceable. Make the clearance smaller. Use two spanner wrenches and adjust the tolerance take-up duct. Safety the adjustment rings on the tolerance take-up duct with safety-wire.

R (17)Replace the coupling that attaches the IP check valve to the intersect

duct.

R (18) TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF YOU DO NOT CLOSE THE COUPLING CORRECTLY, IT WILL CAUSE THE COUPLING TO BECOME DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

R (19) Install the interface duct between the bleed valve and the pylon duct with a seal and coupling. Turn the interface duct so the flex joint lengths are no less that 1.35 in. (34.3 mm).

R (20) TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

R (21) Connect the starter duct to the interface duct with a seal and coupling.

R (22) TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a non-marring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF YOU DO NOT CLOSE THE COUPLING CORRECTLY, IT WILL CAUSE THE COUPLING TO BECOME DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

R (23) Connect the T/R valve air tubes to the interface duct and the intersect duct with seals and couplings (Ref. 78-31-05, P. Block 401).

NOTE : It is very important that the T/R valve air tubes be installed as instructed.

F. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2) Remove access platform.
(3) Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4) Remove safety clips and tags and close circuit breakers 5HA, 7HA, 3HA, 11HA, 8HA, 6HA, 10HA, 4HA and 12HA.
(5) Remove warning notices.

8. Removal/Installation of Thrust Reverser Pneumatic Supply Ducts (that exit from the Pressure Regulator and Shutoff Valve)

A. General

(1) This procedure provides instructions for removal and installation of the thrust reverser pneumatic supply ducts.

(2)Access to the pneumatic supply is through the fan cowl and thrust reverser doors.
For door opening and closing procedures (Ref. 71-13-00, P. Block 301).
(3)For information related to Inspection/Check of hoses, tubes and ducts (Ref. 36-11-00, P. Block 601).
NOTE : To facilitate removal/installation operations, it is recommended to loosen all junction couplings between ducts and between valves and ducts.

B. Equipment and Materials

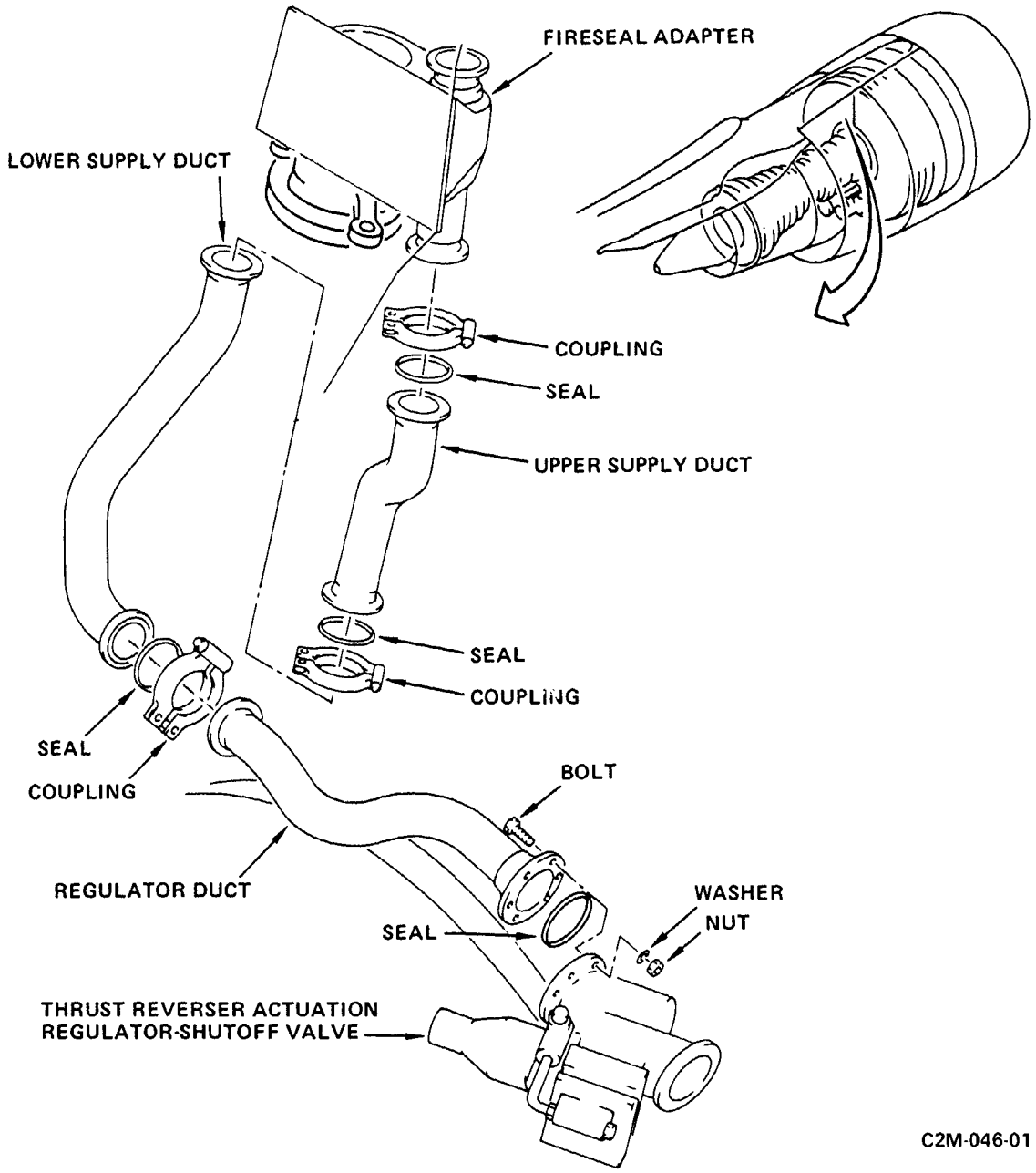
ITEM	DESIGNATION
A.	Access Platform 2.5 m (8 ft.)
B.	Torque Wrench - 50 to 1400 lbf. in. (0.56 to 15.82 m.daN)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	Warning Notices
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-00, P. Block 601	Engine Bleed Air Supply System

C. Job Set-Up
(1)Open, safety and tag the following circuit breakers for appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED & COMPT TEMP/ENG 1 CONTROLLER/ MONITOR	5HA	209/A17
22VU	AIR BLEED & COMPT TEMP/ENG 1 CONTROLLER/ CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG 1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/VALVES/ENG 1 VALVES/BLEED	11HA	311/H54
131VU	AIR BLEED & COMPT TEMP/ENG 2/VALVES/ BLEED	12HA	311/H55
131VU	AIR BLEED & COMPT TEMP/ENG 2/VALVES/ HP	4HA	312/G53
131VU	AIR BLEED & COMPT TEMP/ENG 2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/ENG 2 CONTROLLER/ CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG 2/CONTROLLER	6HA	315/D54

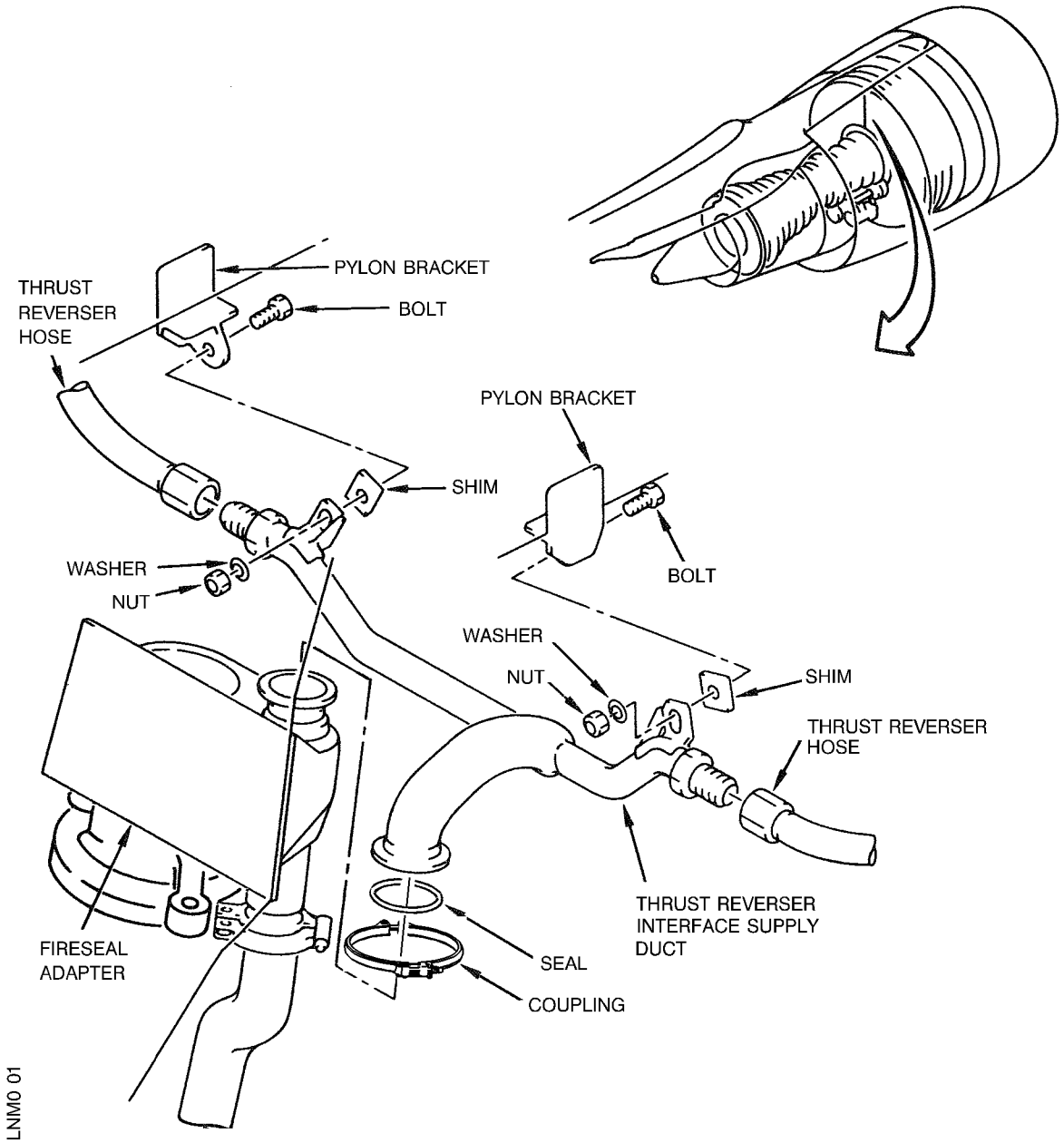
(2)Open fan and thrust reverser cowl doors (Ref. 71-13-00, P. Block 301).
(3)Install access platform.

D. Removal
(Ref. Fig. 415)
(Ref. Fig. 416)



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DM5

Thrust Reverser Lower Supply Ducts
Figure 415



Thrust Reverser Interface Supply Ducts
Figure 416

R

(Ref. Fig. 417)

(1)Remove bolts, washers, nuts, and seal connecting regulator duct to thrust reverser pressure regulating and shutoff valve.

(2)Remove coupling and seal connecting regulator duct to lower supply duct. Remove regulator duct from engine.

(3)Remove couplings and seals connecting upper supply duct to lower supply duct and anti-ice fireseal adapter. Remove ducts from engine.

(4)Remove coupling and seal connecting anti-ice fireseal adapter to thrust reverser interface supply duct.

(5)Disconnect thrust reverser hoses from interface supply duct.

(6)Remove bolts, washers, nuts and shims attaching supply duct to pylon brackets. Remove duct from engine. Retain shims for reinstallation.

(7)Remove couplings and seals connecting anti-ice upper bifurcation duct to engine mount duct and to fireseal adapter. Remove upper bifurcation duct from engine.

(8)Support anti-ice fireseal adapter and remove bolts and washers attaching adapter to junction box. Slide adapter off anti-ice duct and remove from engine.

(9)Cap duct and hose open ends and valve.

E. Installation (Ref. Fig. 415, 416, 417)

(1)Remove blanking caps from ducts, hoses, and valve.

(2)Slide anti-ice fireseal adapter up onto anti-ice duct and attach to junction box with bolts and washers. TORQUE bolts to between 100 and 140 lbf.in. (1.13 and 1.58 m.daN).

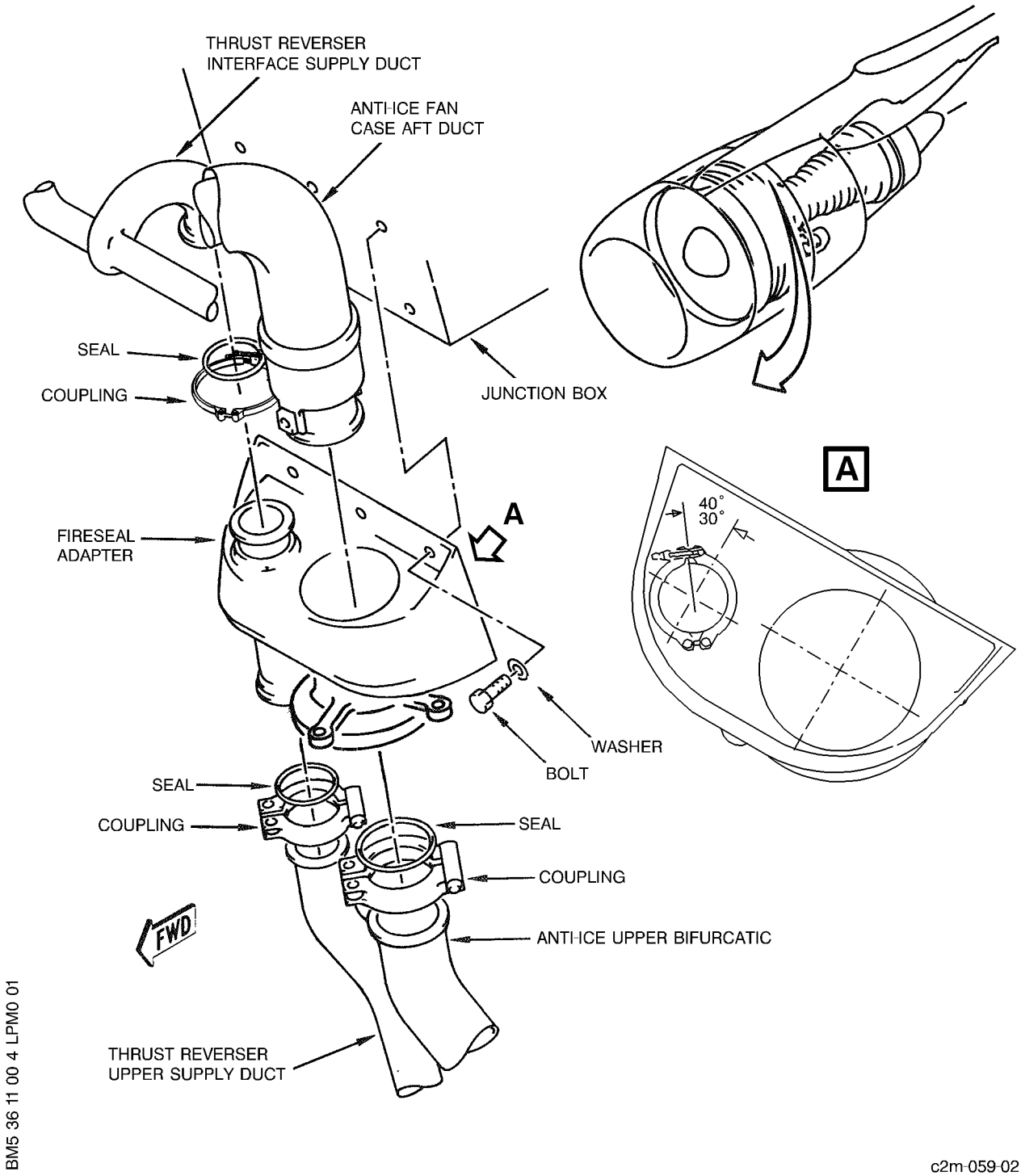
CAUTION : WHEN CLOSING THE COUPLING, BE SURE THE SLIDE END OF THE COUPLING IS LOCATED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 414). FAILURE TO CLOSE THE COUPLING CORRECTLY WILL RESULT IN COUPLING FAILURE. AS A FINAL CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE - IF IT CAN BE MOVED, OPEN THE COUPLING AND RE-INSTALL IT WITH THE SLIDE PROPERLY LOCATED BETWEEN THE COUPLING BODY AND THE NUT.

(3)Connect anti-ice upper bifurcation duct to fireseal adapter and engine mount duct with couplings and seals. TORQUE couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN) and tap perimeter on coupling with nonmarring hammer. RETORQUE and tap again. RETORQUE and tap, then RETORQUE to specified value.

CAUTION : CLOCK THE THRUST REVERSER INTERFACE SUPPLY DUCT COUPLING 30° -40° SO THAT THE COUPLING BOLT DOES NOT FALL OUTSIDE THE FIRESEAL ADAPTER TO PREVENT DAMAGE TO THE THRUST REVERSER.

CAUTION : WHEN CLOSING THE COUPLING, BE SURE THE SLIDE END OF THE COUPLING IS LOCATED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 414). FAILURE TO CLOSE THE COUPLING CORRECTLY WILL RESULT IN COUPLING FAILURE. AS A FINAL CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE - IF IT CAN BE MOVED, OPEN THE COUPLING AND RE-INSTALL IT WITH THE SLIDE PROPERLY LOCATED BETWEEN THE COUPLING BODY AND THE NUT.

(4)Connect thrust reverser interface supply duct to anti-ice fireseal adapter with coupling and seal. TORQUE coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN) and tap perimeter on coupling with



Anti-Ice Fireseal Adapter and Upper Bifurcation Duct
Figure 417

nonmarring hammer. RETORQUE and tap again. RETORQUE and tap, then RETORQUE to specified value. For orientation of the coupling see (Ref. Fig. 416, 417).

(5) Attach interface supply duct to pylon brackets with bolts, washers, shims, and nuts. Torque nuts to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

(6) Connect interface supply duct to thrust reverser hoses. TORQUE hose coupling nuts to between 1260 and 1400 lbf. in.(14.24 and 15.82 m.daN).

CAUTION : WHEN CLOSING THE COUPLING, BE SURE THE SLIDE END OF THE COUPLING IS LOCATED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 414). FAILURE TO CLOSE THE COUPLING CORRECTLY WILL RESULT IN COUPLING FAILURE. AS A FINAL CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE - IF IT CAN BE MOVED, OPEN THE COUPLING AND RE-INSTALL IT WITH THE SLIDE PROPERLY LOCATED BETWEEN THE COUPLING BODY AND THE NUT.

(7) Connect upper supply duct to fireseal adapter with coupling and seal. Do not tighten coupling. (Ref. step (10)).

CAUTION : WHEN CLOSING THE COUPLING, BE SURE THE SLIDE END OF THE COUPLING IS LOCATED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 414). FAILURE TO CLOSE THE COUPLING CORRECTLY WILL RESULT IN COUPLING FAILURE. AS A FINAL CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE - IF IT CAN BE MOVED, OPEN THE COUPLING AND RE-INSTALL IT WITH THE SLIDE PROPERLY LOCATED BETWEEN THE COUPLING BODY AND THE NUT.

(8) Connect lower supply duct to upper supply duct with coupling and seal. Do not tighten. (Ref. step (10)).

CAUTION : WHEN CLOSING THE COUPLING, BE SURE THE SLIDE END OF THE COUPLING IS LOCATED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 414). FAILURE TO CLOSE THE COUPLING CORRECTLY WILL RESULT IN COUPLING FAILURE. AS A FINAL CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE - IF IT CAN BE MOVED, OPEN THE COUPLING AND RE-INSTALL IT WITH THE SLIDE PROPERLY LOCATED BETWEEN THE COUPLING BODY AND THE NUT.

(9) Connect regulator duct to thrust reverser pressure regulating and shutoff valve with bolts, washers, nuts, and seal ; and to lower supply duct with coupling and seal. TORQUE nuts to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).

(10) TORQUE couplings of upper and lower supply ducts and regulator duct to between 115 and 125 lbf.in. (1.30 and 1.41 m. daN) and tap perimeter of couplings with nonmarring hammer. RETORQUE and tap again. Repeat and then RETORQUE to specified value.

F. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Remove access platform.

(3) Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

(4) Remove safety clips and tags and close circuit breakers 5HA, 7HA, 3HA, 11HA, 8HA, 6HA, 10HA, 4HA and 12HA.

(5) Remove warning notices.

1. Operational Test

A. Reason for the Job
- Operational test of HP valves, bleed valves, and crossfeed valve from fire handle
- Continuity test of BLEED FAULT warning circuit
- BITE test
- Functional Test of Automatic Temperature Threshold Set Point Change

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Access Platform
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear - General
- 36-11-19, P. Block 401	Pneumatic Controller 41HA (42HA)
- 49-00-00, P. Block 501	Airborne Auxiliary Power - General
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

R

(c)Make certain that circuit breakers are closed, particularly those associated with AIR BLEED, panel 22VU, AIR BLEED & COMPT TEMP, panel 131VU, and ECAM, panel 21VU.

(d)On ENG 1 and 2 FIRE control modules
- check that ENG 1 FIRE and ENG 2 FIRE handles are pushed (in).

(e)On ENG START section of panel 429VU
- check that ENG START selector switch is in OFF position and that START1 and START2 pushbutton switches are released.

(f)On COMPT TEMP panel 437VU
- check that PACK VALVE 1 and 2 pushbutton switches are released (out) (OFF legends on).

(g)On CABIN PRESS panel 432VU :
- Check that OUTFLOW FWD and AFT pushbutton switches are pressed (in).

NOTE : During the test disregard configuration of MASTER CAUTION warning lights on CAPT and F/O main instrument panels 3VU and 5VU.

(h)For HP valve, bleed valves and crossfeed valve test from fire handle, open, safety and tag the following circuit breakers (for safety reason) :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG 1 & 2/FIRE EXTING/SQUIB A/BTL 1	1WE	335/R71
133VU	ENGINES/ENG 1 & 2/FIRE EXTING/SQUIB A/BTL 2	3WE	335/R72
22VU	FIRE EXTING/ENG 1 & 2/SQUIB B/BTL 1	5WE	207/C19
22VU	FIRE EXTING/ENG 1 & 2/SQUIB B/BTL 2	7WE	207/C20

(j)For bleed valves and HP valves test only, position access platform and open engine core cowl doors to gain access to HP valves and bleed valves (Ref. 71-13-00, P. Block 301).

(k)For crossfeed valve test only, start up APU and pressurize pneumatic system (Ref. 49-00-00, P. Block 501).

(2)Operational test of HP valves, bleed valves and crossfeed valve from fire handle.

(a)Test of crossfeed valve
- pressurize pneumatic system

ACTION	RESULT
1. On AIR BLEED section of panel 436VU, - Select APU BLEED switch in ON position	- Flowbar on APU BLEED annunciator comes on
- press X FEED mode pushbutton switch (AUTO mode).	- MAN legend on X FEED mode pushbutton switch goes off - Flowbar on X FEED valve pushbutton switch comes in line if N APU is higher than 95% (X FEED valve open).
2. On overhead panel ENG 1 (2) FIRE control module 39WD (40WD) - Pull ENG 1 (2) fire handle	On AIR BLEED section of panel 436VU - Flowbar on X FEED valve pushbutton switch is cross line (X FEED valve closed)
- Push ENG 1 (2) fire handle.	- Flowbar on X FEED valve pushbutton switch comes in line.
3. On AIR BLEED section of panel 436VU - Select APU BLEED switch in OFF position.	
4. Shut down APU (Ref. 49-00-00, P. Block 501).	

(b)Test of bleed valves

- open engine core cowl doors.

ACTION	RESULT
1. On AIR BLEED section of panel 436VU - Press ENG 1 (2) BLEED VALVE pushbutton switch (AUTO).	- OFF/R legend goes off - Flowbar on ENG1(2) BLEED VALVE annunciator comes on.
2. On overhead panel ENG 1 (2) FIRE control module : - Pull ENG 1 (2) fire handle.	On AIR BLEED section of panel 436VU - FAULT legend on ENG1(2) BLEED VALVE pushbutton switch comes on. - Flowbar on ENG1(2) BLEED VALVE annunciator goes off. On bleed valve solenoid : - Check for clicking sound as an indication of solenoid energization.
- Push ENG 1 (2) fire handle.	No change.
3. On AIR BLEED section of panel 436VU - release ENG1(2) BLEED VALVE pushbutton switch (OFF/R).	- FAULT legend goes off. - OFF/R legend comes on.
- press ENG1(2) BLEED VALVE pushbutton switch (AUTO).	- OFF/R legend goes off. - Flowbar on ENG1(2) BLEED VALVE annunciator comes on.

(c)Test of HP valves

ACTION	RESULT
1. On AIR BLEED section of panel 436VU - Make certain that ENG 1 (2) BLEED VALVE pushbutton switch is pressed (in) (AUTO).	
2. On AIR BLEED section of panel 436VU - Press ENG 1 (2) HP VALVE pushbutton switch.	- OFF legend goes off.
3. On overhead panel ENG 1 (2) FIRE control module - Pull ENG 1 (2) fire handle	On HP VALVE solenoid : - Check for clicking sound as an indication of solenoid A de-energization.
- Push ENG 1 (2) fire handle.	

(3)Continuity test of BLEED FAULT warning circuit.

ACTION	RESULT
1. On AIR BLEED section of panel 436VU - press ENG 1(2) BLEED VALVE pushbutton switch (AUTO)	- flowbar on ENG1(2) BLEED VALVE annunciator comes on.
2. On AIR BLEED & COMPT TEMP section of maintenance panel 471VU - place test selector switch in BLEED FAULT/L (R) position	- TEST legend on PTT pushbutton switch comes on.
- press then release PTT push-button switch	On AIR BLEED section of panel 436VU - FAULT legend on ENG1(2) BLEED VALVE pushbutton switch comes on - flowbar on ENG1(2) BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. Aural warning : single chime. On L ECAM display unit the following messages are displayed AIR - BLEED VALVE 1(2) FAULT (amber) - AIR X/FEED.....MAN - AIR X/FEED.....IN LINE - BLEED VALVE 1 (2).....OFF/R
3. On AIR BLEED section of panel 436VU - release ENG1(2) BLEED VALVE pushbutton switch (OFF/R)	- FAULT legend goes off. - OFF/R legend comes on.
- press ENG1(2) BLEED VALVE pushbutton switch (AUTO).	- OFF/R legend goes off. - Flowbar on ENG1(2) BLEED VALVE annunciator comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. ECAM messages disappear.

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ACTION	RESULT
4. On maintenance panel 471VU - place test selector switch in	On maintenance panel 471VU - TEST legend on PTT pushbutton

ACTION	RESULT
NORM FLT position	switch goes off.

(4)BITE test
(a)On AIR BLEED section of panel 436VU
- make certain that APU BLEED switch is in OFF/R position
- make certain that HP VALVE pushbutton switch is pressed (in)
- make certain that BLEED VALVE pushbutton switch is pressed (in)
. flowbar of BLEED VALVE annunciator comes on (in line).

(b)On ANTI ICE section of panel 436VU
- make certain that WING SUPPLY pushbutton switch is released out

NOTE : Instructions for performing the test, together with test controls and indicators are located on the front face of the pneumatic controller.

(c)On pneumatic controller 41HA (42HA) located in shelf 96VU (91VU)
- press TEST pushbutton switch
- all display segments are illuminated for 5 seconds
- then display PW ENGINE for 5 seconds
- then display in sequence TESTING 1, TESTING 2, TESTING 3, TESTING 4, TESTING 5, TESTING 6, TESTING 7, TESTING 8 and TESTING 9.
- at the end of the test TEST OK is displayed.
- after one minute display disappears.

R

(Ref. Fig. 501)

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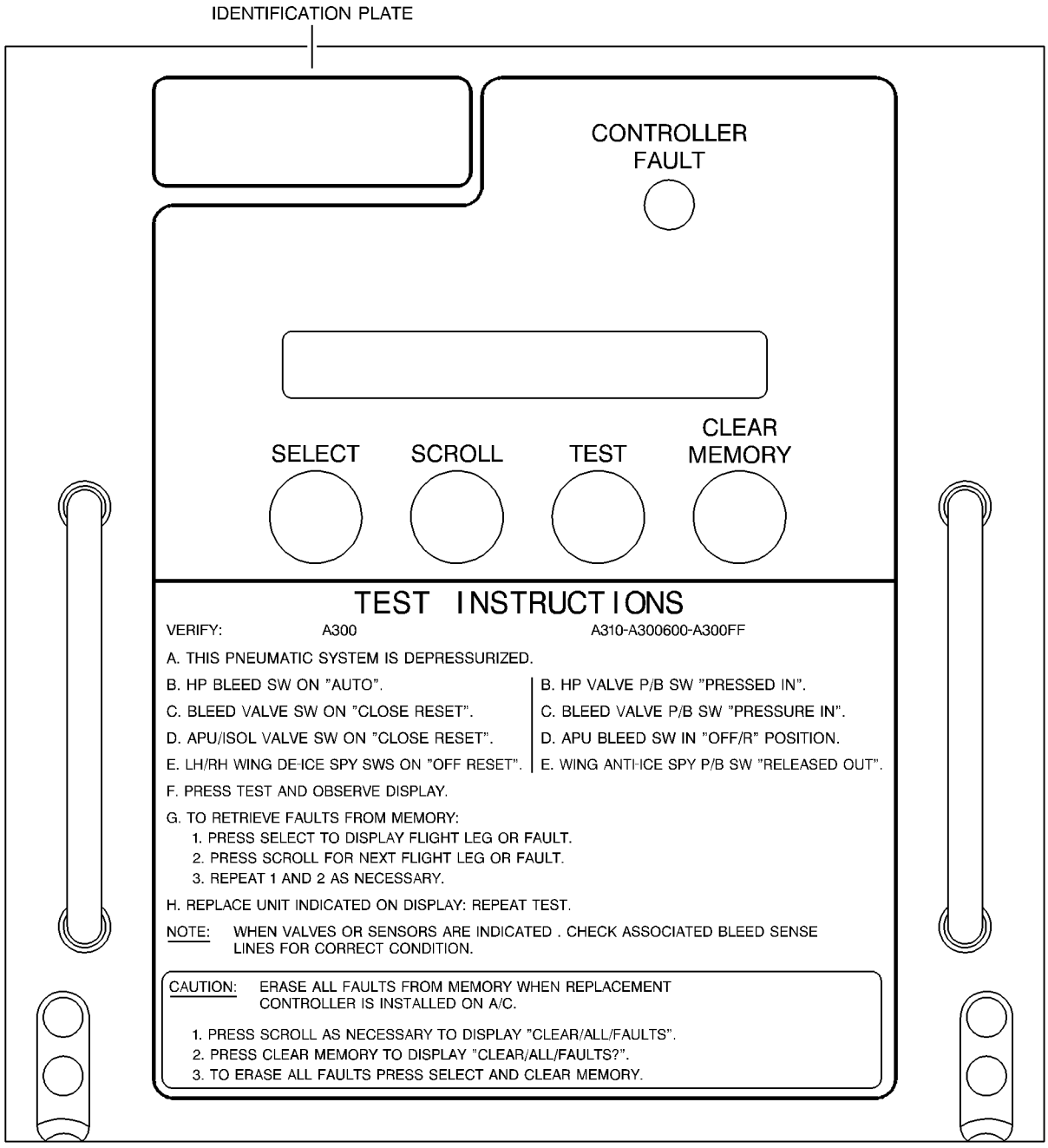
(5)Functional Test of the Automatic Temperature Threshold Set Point Change
(a)Remove pneumatic controllers 41HA and 42HA (Ref. 36-11-19, P. Block 401).
(b)On AIR BLEED section of panel 436VU
- Press ENG1 HP VALVE and ENG2 HP VALVE pushbutton switches (OFF legends go off).
- Press ENG1 BLEED VALVE and ENG2 BLEED VALVE pushbutton switches (OFF/R legends go off).

(c)On circuit breaker panel 131VU
- Close circuit breakers 3HA, 4HA, 9HA, 10HA, 11HA and 12HA.

(d)Check that there is NO ground at pins 25 and 52 on connector 41HA-A and 42HA-A of pneumatic controllers 41HA and 42HA.

(e)NOTE : BEFORE OPENING CIRCUIT BREAKER 1GB TO SIMULATE THE FLIGHT CONFIGURATION (WEIGHT ON WHEELS), MAKE CERTAIN THAT THE SAFETY PRECAUTIONS SET OUT IN AMM 32-00-00, P. Block 501 HAVE BEEN CARRIED OUT.

On circuit breaker panel 133VU
- Open circuit breakers 1GB (location 331/V52) and 119GB (location 332/U52).


IDENTIFICATION PLATE
CONTROLLER FAULT
SELECT
SCROLL
TEST
CLEAR MEMORY
TEST INSTRUCTIONS
VERIFY: A300 A310-A300600-A300FF
A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. HP BLEED SW ON "AUTO".
C. BLEED VALVE SW ON "CLOSE RESET".
D. APU/ISOL VALVE SW ON "CLOSE RESET".
E. LH/RH WING DE-ICE SPY SWS ON "OFF RESET".
B. HP VALVE P/B SW "PRESSED IN".
C. BLEED VALVE P/B SW "PRESSURE IN".
D. APU BLEED SW IN "OFF/R" POSITION.
E. WING ANTI-ICE SPY P/B SW "RELEASED OUT".
F. PRESS TEST AND OBSERVE DISPLAY.
G. TO RETRIEVE FAULTS FROM MEMORY:
1. PRESS SELECT TO DISPLAY FLIGHT LEG OR FAULT.
2. PRESS SCROLL FOR NEXT FLIGHT LEG OR FAULT.
3. REPEAT 1 AND 2 AS NECESSARY.
H. REPLACE UNIT INDICATED ON DISPLAY: REPEAT TEST.
NOTE: WHEN VALVES OR SENSORS ARE INDICATED . CHECK ASSOCIATED BLEED SENSE LINES FOR CORRECT CONDITION.
CAUTION: ERASE ALL FAULTS FROM MEMORY WHEN REPLACEMENT CONTROLLER IS INSTALLED ON A/C.
1. PRESS SCROLL AS NECESSARY TO DISPLAY "CLEAR/ALL/FAULTS".
2. PRESS CLEAR MEMORY TO DISPLAY "CLEAR/ALL/FAULTS?".
3. TO ERASE ALL FAULTS PRESS SELECT AND CLEAR MEMORY.

BM5 36 11 00 5 AHM0 00

BITE Controller
Figure 501

(f)On AIR BLEED section of panel 436VU
- Release ENG1 BLEED VALVE pushbutton switch (OFF/R legend comes on).

1 Check for the presence of a ground :
- On 41HA-A pin 23 of pneumatic controller 41HA.
- On 42HA-A pins 23, 50 and 52 of pneumatic controller 42HA.

2 Check that there is NO ground on 42HA-A pin 25 of pneumatic controller 42HA.

(g)On AIR BLEED section of panel 436VU
- Release ENG2 BLEED VALVE pushbutton switch (OFF/R legend comes on).

1 Check for the presence of a ground :
- On 42HA-A pin 23 of pneumatic controller 42HA.
- On 41HA-A pins 23, 50 and 52 of pneumatic controller 41HA.

2 Check that there is NO ground on 41HA-A pin 25 of pneumatic controller 41HA.

(h)On AIR BLEED section of panel 436VU
- Press ENG1 BLEED VALVE pushbutton switch (OFF/R legend goes off).

First, there is electrical ground on :
R - 42HA-A pin 52 of pneumatic controller 42HA.

After approximately 3 minutes, check that there is NO ground on :
R - 42HA-A pin 52 of pneumatic controller 42HA.

(j)On AIR BLEED section of panel 436VU
- Press ENG2 BLEED VALVE pushbutton switch (OFF/R legend goes off).

First, there is electrical ground on :
R - 41HA-A pin 52 of pneumatic controller 41HA.
R

After approximately 3 minutes, check that there is NO ground on :
R - 41HA-A pin 52 of pneumatic controller 41HA.
R - 42HA-A pin 52 of pneumatic controller 42HA.

(k)On AIR BLEED section of panel 436VU
- Release ENG1 HP VALVE pushbutton switch (OFF legend comes on).

1 Check for the presence of a ground :
- on 41HA-A pin 23 of pneumatic controller 41HA.
- on 42HA-A pins 23, 50 and 52 of pneumatic controller 42HA.

2 Check that there is NO ground on 42HA-A pin 25 of pneumatic controller 42HA.
Press ENG1 HP VALVE pushbutton switch (OFF legend goes off).
3 minutes later, check that there is NO ground at pin 52 of pneumatic controller 42HA.

(l)On AIR BLEED section of panel 436VU
- Release ENG2 HP VALVE pushbutton switch (OFF legend comes on).

1 Check for the presence of a ground :
- on 42HA-A pin 23 of pneumatic controller 42HA.
- on 41HA-A pins 23, 50 and 52 of pneumatic controller 41HA.

2 Check that there is NO ground on 41HA-A pin 25 of pneumatic controller 41HA.
Press ENG2 HP VALVE pushbutton switch (OFF legend goes off).
3 minutes later, check that there is NO ground at pin 52 of pneumatic controller 41HA.

(m)On ANTI ICE section of panel 426VU
- Press ANTI ICE/WING SUPPLY pushbutton switch (ON legend comes on)

1 Check that there is NO ground on :

- 41HA-A pins 23, 50 and 52 of pneumatic controller 41HA.
- 42HA-A pins 23, 50 and 52 of pneumatic controller 42HA.

2 Check for the presence of a ground on :
- 41HA-A pin 25 of pneumatic controller 41HA.
- 42HA-A pin 25 of pneumatic controller 42HA.

(n)On ANTI ICE section of panel 426VU
- Release ANTI ICE/WING SUPPLY pushbutton switch (ON legend goes off).

Check that there is NO ground on :
- 42HA-A pin 25 of pneumatic controller 42HA.

Check that there is NO ground on :
- 41HA-A pin 25 of pneumatic controller 41HA.

(p)On circuit breaker panel 133VU
- Close circuit breakers 1GB and 119GB.

(q)Install pneumatic controllers 41HA and 42HA (Ref. 36-11-19, P. Block 401).

R

(6)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.
(c)Remove safety clips and tags and close circuit breakers 1WE, 3WE, 5WE and 7WE.
(d)Close engine cowl doors (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.

ENGINE BLEED AIR SUPPLY SYSTEM - ADJUSTMENT/TEST

1. Operational Test

A. Reason for the Job
- Operational test of HP valves, bleed valves, and crossfeed valve from fire handle
- Continuity test of BLEED FAULT warning circuit
- BITE test
- Integrity of BITE function
- Functional Test of Automatic Temperature Threshold Set Point Change.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Access Platform
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear - General
- 36-11-19, P. Block 401	Pneumatic Controller 41HA (42HA)
- 49-00-00, P. Block 501	Airborne Auxiliary Power - General
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.

**ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

ENGINE BLEED AIR SUPPLY SYSTEM - ADJUSTMENT/TEST

1. Operational Test

A. Reason for the Job
- Operational test of HP valves, bleed valves, and crossfeed valve from fire handle
- Continuity test of BLEED FAULT warning circuit
- BITE test
- Functional Test of Automatic Temperature Threshold Set Point Change.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Circuit Breaker Safety Clips
(2)	Access Platform

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 32-00-00, P. Block 501	Landing Gear - General
- 36-11-19, P. Block 401	Pneumatic Controller 41HA (42Ha)
- 49-00-00, P. Block 501	Airborne Auxiliary Power - General
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

**ON A/C 001-100,

(c)Make certain that circuit breakers are closed, particularly those associated with **AIR BLEED**, panel 22VU, **AIR BLEED & COMPT TEMP**, panel 131VU, and **ECAM**, panel 21VU.

(d)On **ENG** 1 and 2 **FIRE** control modules

- check that **ENG 1 FIRE** and **ENG 2 FIRE** handles are pushed (in).

(e)On **ENG START** section of panel 429VU

- check that **ENG START** selector switch is in **OFF** position and that **START1** and **START2** pushbutton switches are released.

(f)On **COMPT TEMP** panel 437VU

- check that **PACK VALVE** 1 and 2 pushbutton switches are released (out) (**OFF** legends on).

(g)On **CABIN PRESS** panel 432VU :

- Check that **OUTFLOW FWD** and **AFT** pushbutton switches are pressed (in).

NOTE : During the test disregard configuration of **MASTER CAUTION** warning lights on **CAPT** and **F/O** main instrument panels 3VU and 5VU.

(h)For **HP** valve, bleed valves and crossfeed valve test from fire handle, open, safety and tag the following circuit breakers (for safety reason) :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENGINES/ENG 1 & 2/FIRE EXTING/SQUIB A/BTL 1	1WE	335/R71
133VU	ENGINES/ENG 1 & 2/FIRE EXTING/SQUIB A/BTL 2	3WE	335/R72
22VU	FIRE EXTING/ENG 1 & 2/SQUIB B/BTL 1	5WE	207/C19
22VU	FIRE EXTING/ENG 1 & 2/SQUIB B/BTL 2	7WE	207/C20

(j)For bleed valves and **HP** valves test only, position access platform and open engine core cowl doors to gain access to **HP** valves and bleed valves (Ref. 71-13-00, P. Block 301).

(k)For crossfeed valve test only, start up **APU** and pressurize pneumatic system (Ref. 49-00-00, P. Block 501).

(2)Operational test of HP valves, bleed valves and crossfeed valve from fire handle.

(a)Test of crossfeed valve

- pressurize pneumatic system

ACTION	RESULT
1. On AIR BLEED section of panel 436VU,	
- Select APU BLEED switch in ON position	- Flowbar on APU BLEED annunciator comes on
- press X FEED mode pushbutton switch (AUTO mode).	- MAN legend on X FEED mode pushbutton switch goes off - Flowbar on X FEED valve pushbutton switch comes in line if N APU is higher than 95% (X FEED valve open).
2. On overhead panel ENG 1 (2) FIRE control module 39WD (40WD)	
- Pull ENG 1 (2) fire handle	On AIR BLEED section of panel 436VU - Flowbar on X FEED valve pushbutton switch is cross line (X FEED valve closed)
- Push ENG 1 (2) fire handle.	- Flowbar on X FEED valve pushbutton switch comes in line.
3. On AIR BLEED section of panel 436VU - Select APU BLEED switch in OFF position.	
4. Shut down APU (Ref. 49-00-00, P. Block 501).	

(b)Test of bleed valves

- open engine core cowl doors.

ACTION	RESULT
1. On AIR BLEED section of panel 436VU	
- Press ENG 1 (2) BLEED VALVE pushbutton switch (AUTO).	- OFF/R legend goes off - Flowbar on ENG1(2) BLEED VALVE annunciator comes on.
2. On overhead panel ENG 1 (2) FIRE control module : - Pull ENG 1 (2) fire handle.	On AIR BLEED section of panel 436VU - FAULT legend on ENG1(2) BLEED VALVE pushbutton switch comes on. - Flowbar on ENG1(2) BLEED VALVE annunciator goes off.

ACTION	RESULT
	On BLEED valve solenoid: - Check for clicking sound as an indication of solenoid energization.
- Push ENG 1 (2) fire handle.	No change.
3. On AIR BLEED section of panel 436VU - release ENG1(2) BLEED VALVE pushbutton switch (OFF/R) .	- FAULT legend goes off. - OFF/R legend comes on.
- press ENG1(2) BLEED VALVE pushbutton switch (AUTO)	- OFF/R legend goes off. - Flowbar on ENG1(2) BLEED VALVE annunciator comes on.

(c)Test of HP valves

ACTION	RESULT
1. On AIR BLEED section of panel 436VU - Make certain that ENG 1 (2) BLEED VALVE pushbutton switch is pressed (in) (AUTO).	
2. On AIR BLEED section of panel 436VU - Press ENG 1 (2) HP VALVE pushbutton switch.	- OFF legend goes off.
3. On overhead panel ENG 1 (2) FIRE control module - Pull ENG 1 (2) fire handle	On HP VALVE solenoid : - Check for clicking sound as an indication of solenoid A de-energization.
- Push ENG 1 (2) fire handle.	

(3)Continuity test of BLEED FAULT warning circuit.

ACTION	RESULT
1. On AIR BLEED section of panel 436VU - press ENG 1(2) BLEED VALVE pushbutton switch (AUTO)	- flowbar on ENG1(2) BLEED VALVE annunciator comes on.
2. On AIR BLEED & COMPT TEMP section of maintenance panel 471VU - place test selector switch in BLEED FAULT/L (R) position	- TEST legend on PTT pushbutton switch comes on.

ACTION	RESULT
- press then release PTT push-button switch	On AIR BLEED section of panel 436VU - FAULT legend on ENG1(2) BLEED VALVE pushbutton switch comes on - flowbar on ENG1(2) BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. Aural warning : single chime. On L ECAM display unit the following messages are displayed AIR - BLEED VALVE 1(2) FAULT (amber) - AIR X/FEED.....MAN - AIR X/FEED.....IN LINE - BLEED VALVE 1 (2).....OFF/R
3. On AIR BLEED section of panel 436VU - release ENG1(2) BLEED VALVE pushbutton switch (OFF/R)	- FAULT legend goes off. - OFF/R legend comes on.
- press ENG1(2) BLEED VALVE pushbutton switch (AUTO).	- OFF/R legend goes off. - Flowbar on ENG1(2) BLEED VALVE annunciator comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. - ECAM messages disappear.
4. On maintenance panel 471VU - place test selector switch in NORM FLT position	On maintenance panel 471VU - TEST legend on PTT pushbutton switch goes off.

**ON A/C 001-005,

(Ref. Fig. 501)

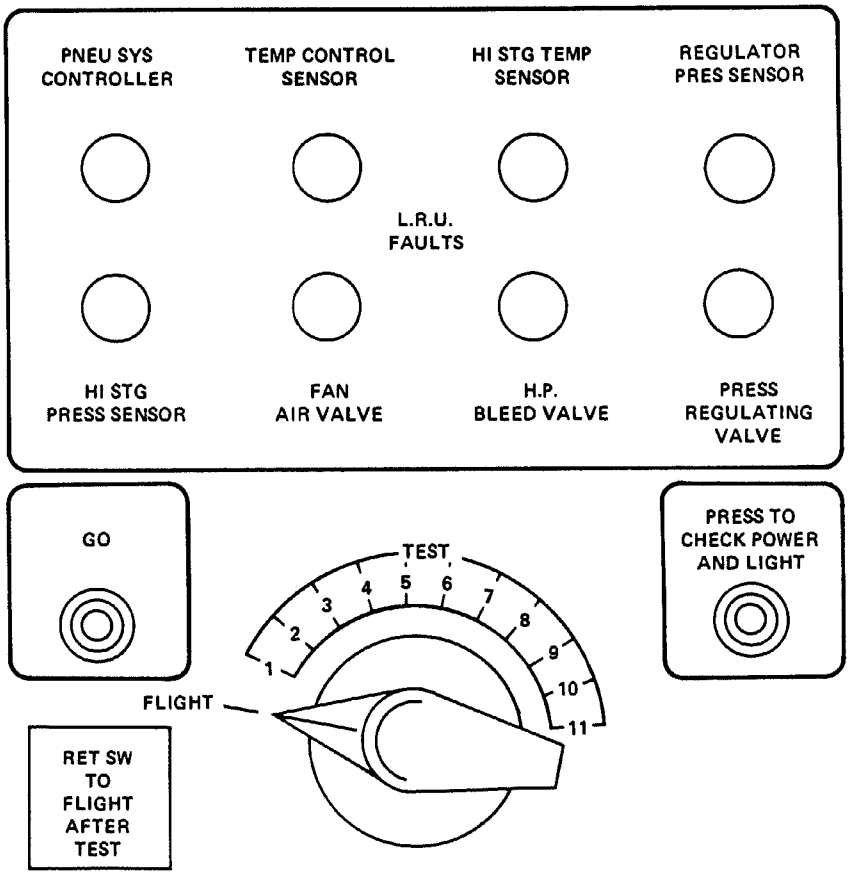
**ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. WAITING FOR 'GO' - GREEN LIGHT - IN EACH POSITION, ROTATE TEST SWITCH THROUGH POSITIONS 1 TO 11. DISREGARD ANY MOMENTARY LIGHT FLASHES AND RECORD ONLY STEADY STATE INDICATIONS.
3. IF 'L.R.U. FAULT' IS INDICATED - RED LIGHT - IN ANY POSITION STOP TEST. REPLACE CORRESPONDING L.R.U. RETURN SWITCH TO 'FLIGHT'. REPEAT TEST.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



BM5 36 11 00 5 AEMO - 01/28 - 01/23
DM5

BITE Controller
Figure 501

(Ref. Fig. 502)

**ON A/C 001-005,

(4)BITE test
(a)On pneumatic controller 41HA (42HA) located on shelf 96VU (91VU)
- press briefly PRESS TO CHECK POWER AND LIGHT pushbutton to check that all annunciator lights operate correctly and that both 115VAC power supplies are operative
. all annunciator lights come on
- place TEST selector switch successively in positions 1 to 11, maintaining it for approximately 10 seconds in each position, and check
. GO green indicator light comes on after 10 seconds in each position
. If LRU FAULT red light comes on in any position, stop test ; perform trouble shooting to clear the failure, (replace or repair LRU, aircraft wiring, pneumatic sense line) then return TEST selector switch to FLIGHT position ; repeat test.
. If GO green indicator light comes on in all test positions, return TEST selector switch to FLIGHT position.

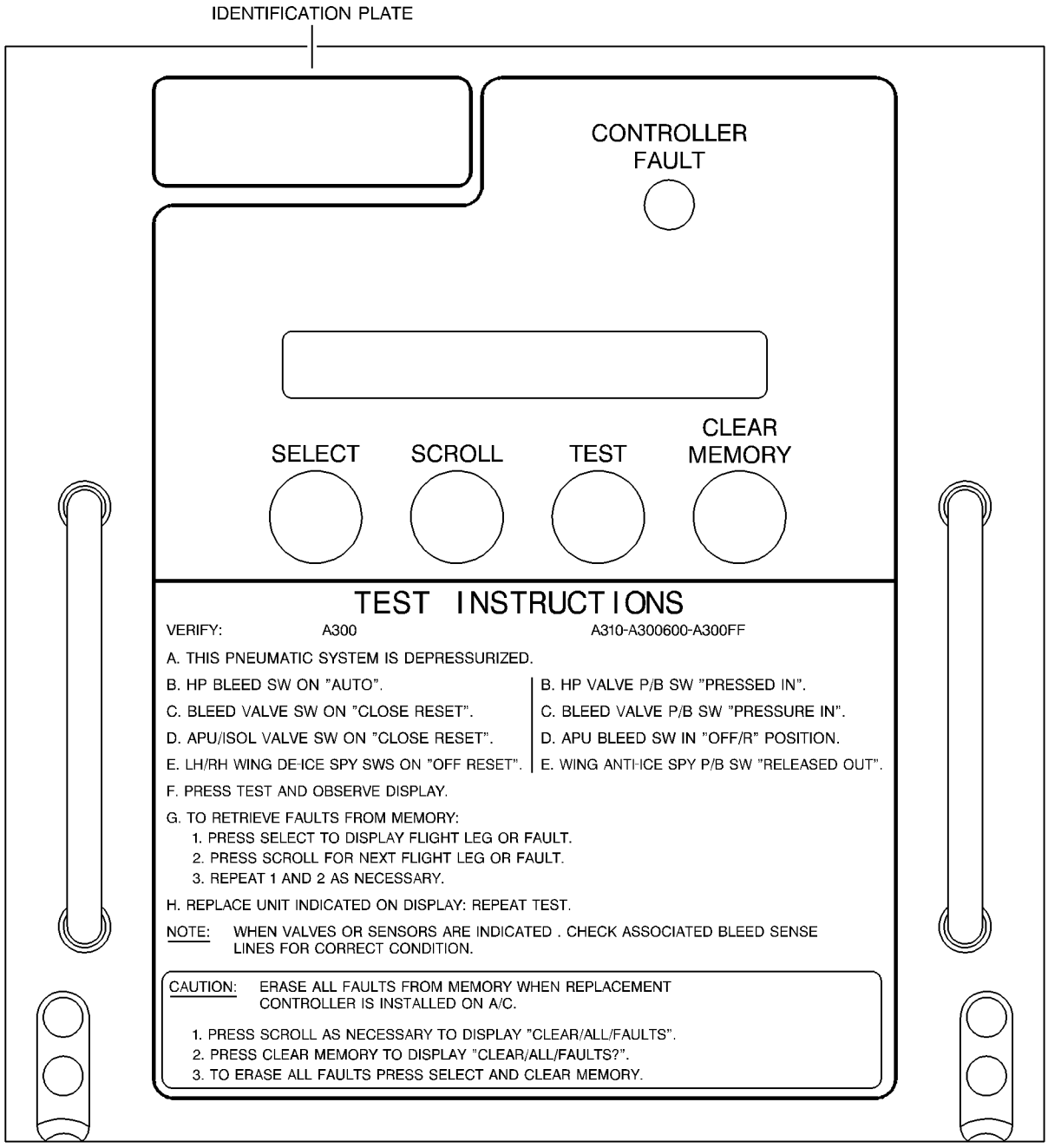
**ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

(4)BITE test
(a)On AIR BLEED section of panel 436VU
- make certain that APU BLEED switch is in OFF/R position
- make certain that HP VALVE pushbutton switch is pressed (in)
- make certain that BLEED VALVE pushbutton switch is pressed (in)
. flowbar of BLEED VALVE annunciator comes on (in line).
(b)On ANTI ICE section of panel 436VU
- make certain that WING SUPPLY pushbutton switch is released out
NOTE : Instructions for performing the test, together with test controls and indicators are located on the front face of the pneumatic controller.
(c)On pneumatic controller 41HA (42HA) located in shelf 96VU (91VU)
- press TEST pushbutton switch
- all display segments are illuminated for 5 seconds
- then display GE ENGINE for 5 seconds
- then display in sequence TESTING 1, TESTING 2, TESTING 3, TESTING 4, TESTING 5, TESTING 6, TESTING 7, TESTING 8 and TESTING 9.
- at the end of the test, TEST OK is displayed.
- after one minute display disappears.

**ON A/C 001-005,

(Ref. Fig. 503, 504, 505)
(5)Integrity of BITE function


IDENTIFICATION PLATE
CONTROLLER FAULT
SELECT
SCROLL
TEST
CLEAR MEMORY
TEST INSTRUCTIONS
VERIFY: A300 A310-A300600-A300FF
A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. HP BLEED SW ON "AUTO".
C. BLEED VALVE SW ON "CLOSE RESET".
D. APU/ISOL VALVE SW ON "CLOSE RESET".
E. LH/RH WING DE-ICE SPY SWS ON "OFF RESET".
B. HP VALVE P/B SW "PRESSED IN".
C. BLEED VALVE P/B SW "PRESSURE IN".
D. APU BLEED SW IN "OFF/R" POSITION.
E. WING ANTI-ICE SPY P/B SW "RELEASED OUT".
F. PRESS TEST AND OBSERVE DISPLAY.
G. TO RETRIEVE FAULTS FROM MEMORY:
1. PRESS SELECT TO DISPLAY FLIGHT LEG OR FAULT.
2. PRESS SCROLL FOR NEXT FLIGHT LEG OR FAULT.
3. REPEAT 1 AND 2 AS NECESSARY.
H. REPLACE UNIT INDICATED ON DISPLAY: REPEAT TEST.
NOTE: WHEN VALVES OR SENSORS ARE INDICATED . CHECK ASSOCIATED BLEED SENSE LINES FOR CORRECT CONDITION.
CAUTION: ERASE ALL FAULTS FROM MEMORY WHEN REPLACEMENT CONTROLLER IS INSTALLED ON A/C.
1. PRESS SCROLL AS NECESSARY TO DISPLAY "CLEAR/ALL/FAULTS".
2. PRESS CLEAR MEMORY TO DISPLAY "CLEAR/ALL/FAULTS?".
3. TO ERASE ALL FAULTS PRESS SELECT AND CLEAR MEMORY.

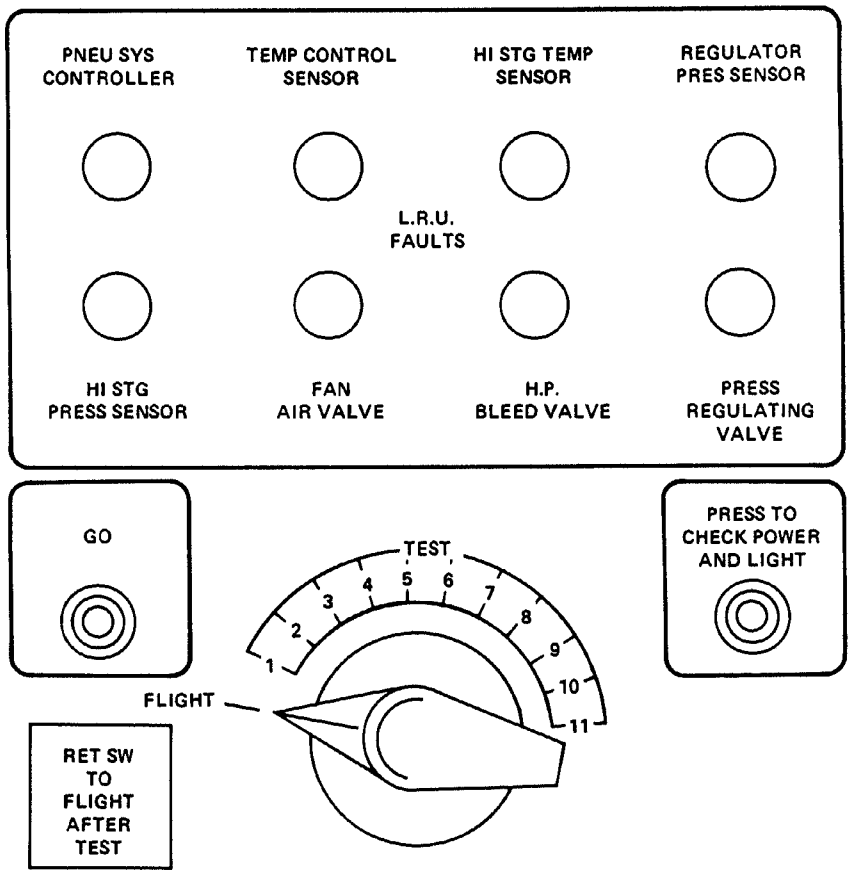
BM5 36 11 00 5 AHM0 00

BITE Controller
Figure 502

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. WAITING FOR 'GO' - GREEN LIGHT - IN EACH POSITION, ROTATE TEST SWITCH THROUGH POSITIONS 1 TO 11. DISREGARD ANY MOMENTARY LIGHT FLASHES AND RECORD ONLY STEADY STATE INDICATIONS.
3. IF 'L.R.U. FAULT' IS INDICATED - RED LIGHT - IN ANY POSITION STOP TEST. REPLACE CORRESPONDING L.R.U. RETURN SWITCH TO 'FLIGHT'. REPEAT TEST.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



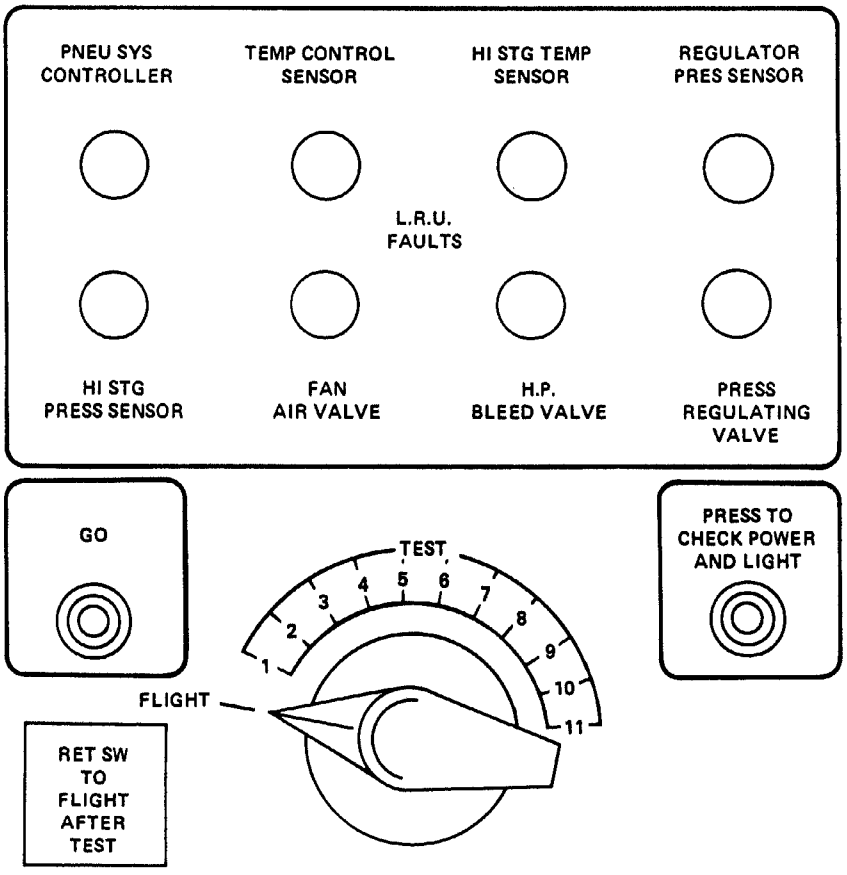
BM5 36 11 00 5 SLMO - 28 - 23
DM5

Pneumatic Controller Front Face Label BITE Instructions - Existing
Figure 503

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. WAITING FOR 'GO' - GREEN LIGHT - IN EACH POSITION, ROTATE TEST SWITCH THROUGH POSITIONS 1 TO 11. DISREGARD ANY MOMENTARY LIGHT FLASHES AND RECORD ONLY STEADY STATE INDICATIONS.
3. IF 'L.R.U. FAULT' IS INDICATED - RED LIGHT - IN ANY POSITION STOP TEST. REFER TO TSM. RECTIFY. RETURN SWITCH TO " FLIGHT " . REPEAT TEST.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



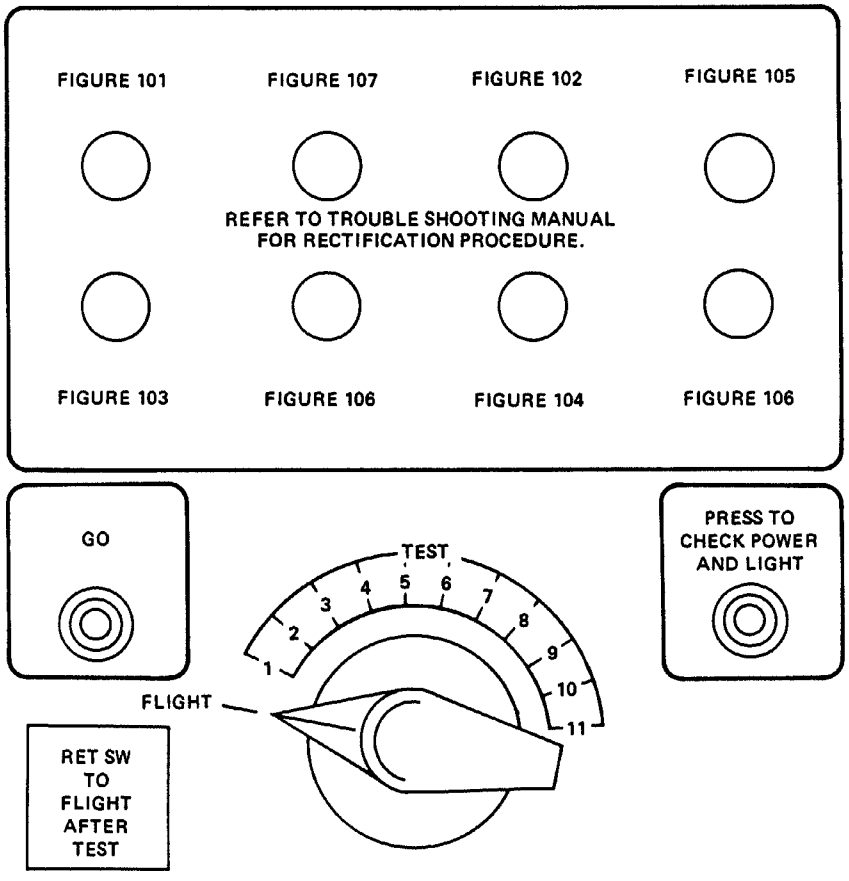
BM5 36 11 00 5 SLNO - 28 - 23
DM5

Pneumatic Controller Front Face Label BITE Instructions - Recommended
Figure 504

A300 TEST INSTRUCTIONS A310 A300/600 A300 FF

VERIFY : A. THIS PNEUMATIC SYSTEM IS DEPRESSURIZED.
B. ALL CIRCUIT BREAKERS FOR THIS SYSTEM HAVE POWER AND ARE CLOSED.
C. HP BLEED SW ON "AUTO".
D. BLEED VALVE SW ON "CLOSE RESET".
E. APU/ISOL VALVE SW ON "CLOSE RESET".
F. LH & RH WING DE ICE SPY SWS ON "OFF RES".
C. HP VALVE P/BSW "PRESSED IN".
D. BLEED VALVE P/BSW "PRESSED IN".
E. APU BLEED SW IN "OFF/R POSITION.
F. WING ANTI ICE SPY P/BSW "RELEASED OUT".

1. PRESS TO CHECK POWER AND LIGHTS - NO PANEL LIGHTS WILL LIGHT IF EITHER AC POWER SOURCE IS OFF - REPLACE ANY FAULTY BULBS.
CAUTION : ON TEST SWITCH - AFTER SELECTING ANY TEST POSITION, DO NOT RETURN SWITCH TO FLIGHT UNTIL SO DIRECTED - OTHERWISE, A FAULTY SYSTEM MAY TEST OK.
2. ROTATE TEST SWITCH TO POSITION 1. WAIT FOR SINGLE STEADY INDICATION.
. RED LIGHT. STOP TEST. RECTIFY IN ACCORDANCE WITH TSM.
THEN SWITCH TO " FLIGHT " . THEN REPEAT TEST.
. GREEN LIGHT. PROCEED TO NEXT TEST SWITCH POSITION.
3. REPEAT STEP 2. FOR EACH POSITION 1 TO 11.
4. IF ALL TEST POSITIONS ARE 'GO' SYSTEM IS O.K. RETURN SWITCH TO 'FLIGHT'.



BM5 36 11 00 5 SLPO - 28 - 23
DM5

Pneumatic Controller Front Face Label BITE
Instructions - Recommended Alternate
Figure 505

Printed in France

(a)On AIR BLEED section of panel 436VU
- make certain that APU BLEED switch is in OFF/R position
- make certain that HP VALVE pushbutton switch is pressed (in)
- make certain that BLEED VALVE pushbutton switch is pressed (in)
  . flowbar of BLEED VALVE annunciator comes on (in line).

(b)On ANTI ICE section of panel 426VU
- make certain that WING SUPPLY pushbutton switch is released (out).

NOTE : Instructions for performing the test, together with test controls and indicators are located on the face of pneumatic controller.

(c)On pneumatic controller 41HA (42HA) located in shelf 96VU (91VU)
- Place TEST selector switch in position 1 for 3 seconds and then in FLIGHT position to cancel any warning triggered.
- Press briefly PRESS TO CHECK POWER AND LIGHT pushbutton to check that all annunciator lights operate correctly and that both 115VAC power supplies are operative
  . all annunciator lights come on.
- Place TEST selector switch successively in positions 1 to 11, maintaining it for approximately 10 seconds in each position, and check configuration of annunciator lights and indications on controller, on panel 436VU, and on ECAM display units.

NOTE : 1- GO green indicator light comes on after 10 seconds.
2- AIR BLEED/PRESS indicator reads the pneumatic pressure at the left bleed valve outlet only.
3- To illuminate FAULT legend on HP VALVE pushbutton switch on panel 436VU, TEST selector switch must remain 60 seconds in positions 1, 3, 5 and 6.
4- If LRU FAULT red light comes on in any position, stop test ; replace corresponding LRU, return TEST selector switch to FLIGHT position ; repeat test.

	AIR BLEED PANEL 436VU		ECAM DISPLAY UNITS	
TEST SELECT SW	FAULT LEGEND ON HP VALVE P/BSW	FAULT LEGEND ON BLEED VALVE P/BSW	Right PRESS IND (PSI ±4)	Left BLEED VALVE FAULT MESSAGE
1	ON	ON	34	ON
2	OFF	ON	34	ON
3	ON	ON	0	ON
4	OFF	ON	34	ON
5	ON	ON	34	ON
6	ON	ON	62	ON
7	OFF	ON	43	ON
8	OFF	ON	34	ON

TEST SELECT SW	AIR BLEED PANEL 436VU FAULT LEGEND ON HP VALVE P/BSW	FAULT LEGEND ON BLEED VALVE P/BSW	ECAM DISPLAY UNITS Right PRESS IND (PSI ±4)	ECAM DISPLAY UNITS Left BLEED VALVE FAULT MESSAGE
9	OFF	ON	0	ON
10	OFF	ON	0	ON
11	OFF	ON	0	ON
FLIGHT	OFF	ON	0	ON

- Release then press in BLEED VALVE pushbutton switch.
- Place TEST selector switch in position 1
  . FAULT legend on BLEED VALVE pushbutton switch comes on
  . FAULT legend on HP VALVE pushbutton switch comes on after a 60 second time delay approx.
- Return TEST selector switch to FLIGHT position
  . FAULT legend on HP VALVE pushbutton switch goes off.
- Release then press BLEED VALVE pushbutton switch.
  . FAULT legend on BLEED VALVE pushbutton switch goes off.
- Place TEST selector switch directly from FLIGHT position to position 2 without waiting for green GO indicator to come on at position 1.
  . FAULT legend on BLEED VALVE pushbutton switch comes on after a 60 second time delay approx.
- Return TEST selector switch to FLIGHT position to cancel all the warnings.
- Release then press in BLEED VALVE pushbutton switch.

**ON A/C 001-100,

(5)Functional Test of the Automatic Temperature Threshold Set Point Change
(a)Remove pneumatic controllers 41HA and 42HA (Ref. 36-11-19, P. Block 401).
(b)On AIR BLEED section of panel 436VU
- Press ENG1 HP VALVE and ENG2 HP VALVE pushbutton switches (OFF legends go off).
- Press ENG1 BLEED VALVE and ENG2 BLEED VALVE pushbutton switches (OFF/R legends go off).

(c)On circuit breaker panel 131VU
- Close circuit breakers 3HA, 4HA, 9HA, 10HA, 11HA and 12HA.

(d)Check that there is NO ground at pins 25 and 52 on connector 41HA-A and 42HA-A of pneumatic controllers 41HA and 42HA.
(e)NOTE : BEFORE OPENING CIRCUIT BREAKER 1GB TO SIMULATE THE FLIGHT CONFIGURATION (WEIGHT ON WHEELS), MAKE CERTAIN THAT THE SAFETY PRECAUTIONS SET OUT IN AMM 32-00-00, P. Block 501 HAVE BEEN CARRIED OUT.
On circuit breaker panel 133VU

- Open circuit breakers 1GB (location 331/V52) and 119GB (location 331/U52).

(f)On AIR BLEED section of panel 436VU
- Release ENG1 BLEED VALVE pushbutton switch (OFF/R legend comes on).

1 Check for the presence of a ground :
- On 41HA-A pin 23 of pneumatic controller 41HA.
- On 42HA-A pins 23, 50 and 52 of pneumatic controller 42HA.

2 Check that there is NO ground on 42HA-A pin 25 of pneumatic controller 42HA.

(g)On AIR BLEED section of panel 436VU
- Release ENG2 BLEED VALVE pushbutton switch (OFF/R legend comes on).

1 Check for the presence of a ground :
- On 42HA-A pin 23 of pneumatic controller 42HA.
- On 41HA-A pins 23, 50 and 52 of pneumatic controller 41HA.

2 Check that there is NO ground on 41HA-A pin 25 of pneumatic controller 41HA.

(h)On AIR BLEED section of panel 436VU
- Press ENG1 BLEED VALVE pushbutton switch (OFF/R legend goes off).

First, there is electrical ground on :
R - 42HA-A pin 52 of pneumatic controller 42HA-A.

After approximately 3 minutes, check that there is NO ground on :
R - 42HA-A pin 52 of pneumatic controller 42HA.

(j)On AIR BLEED section of panel 436VU
- Press ENG2 BLEED VALVE pushbutton switch (OFF/R legend goes off).

First, there is electrical ground on :
R - 41HA-A pin 52 of pneumatic controller 41HA.
R

After approximately 3 minutes, check that there is NO ground on :
R - 41HA-A pin 52 of pneumatic controller 41HA.
R - 42HA-A pin 52 of pneumatic controller 42HA.

(k)On AIR BLEED section of panel 436VU
- Release ENG1 HP VALVE pushbutton switch (OFF legend comes on).

1 Check for the presence of a ground :
- on 41HA-A pin 23 of pneumatic controller 41HA.
- on 42HA-A pins 23, 50 and 52 of pneumatic controller 42HA.

2 Check that there is NO ground on 42HA-A pin 25 of pneumatic controller 42HA.
Press ENG1 HP VALVE pushbutton switch (OFF legend goes off).
3 minutes later, check that there is NO ground at pin 52 of pneumatic controller 42HA.

(l)On AIR BLEED section of panel 436VU
- Release ENG2 HP VALVE pushbutton switch (OFF legend comes on).

1 Check for the presence of a ground :
- on 42HA-A pin 23 of pneumatic controller 42HA.
- on 41HA-A pins 23, 50 and 52 of pneumatic controller 41HA.

2 Check that there is NO ground on 41HA-A pin 25 of pneumatic controller 41HA.
Press ENG2 HP VALVE pushbutton switch (OFF legend goes off).
3 minutes later, check that there is NO ground at pin 52 of pneumatic controller 41HA.

(m)On ANTI ICE section of panel 426VU

- Press ANTI ICE/WING SUPPLY pushbutton switch (ON legend comes on)

1 Check that there is NO ground on :
- 41HA-A pins 23, 50 and 52 of pneumatic controller 41HA.
- 42HA-A pins 23, 50 and 52 of pneumatic controller 42HA.

2 Check for the presence of a ground on :
- 41HA-A pin 25 of pneumatic controller 41HA.
- 42HA-A pin 25 of pneumatic controller 42HA.

(n)On ANTI ICE section of panel 426VU
- Release ANTI ICE/WING SUPPLY pushbutton switch (ON legend goes off).

Check that there is NO ground on :
- 42HA-A pin 25 of pneumatic controller 42HA.

Check that there is NO ground on :
- 41HA-A pin 25 of pneumatic controller 41HA.

(p)On circuit breaker panel 133VU
- Close circuit breakers 1GB and 119GB.

(q)Install pneumatic controllers 41HA and 42HA (Ref. 36-11-19, P. Block 401).

**ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

(7)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.
(c)Remove safety clips and tags and close circuit breakers 1WE, 3WE, 5WE and 7WE.
(d)Close engine cowl doors (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.

**ON A/C 001-005,

(6)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.
(c)Remove safety clips and tags and close circuit breakers 1WE, 3WE, 5WE and 7WE.
(d)Close engine cowl doors (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.

**ON A/C 001-100,

2. Operational Test

A. Reason for the Job

R - Test of bleed air system with engines and APU in operation.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power
- 71-00-00, P. Block 501	Power Plant

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

R (b)On **AIR BLEED** section of panel **436VU** :

R - Make certain that **ENG 1 BLEED VALVE** and **ENG 2 BLEED VALVE** pushbutton switches are pressed (**OFF/R** legends are off).

R - Make certain that **ENG 1 HP VALVE** and **ENG 2 HP VALVE** pushbutton switches are pressed (**OFF/R** legends are off).

R (c)On **COMP TEMP** panel **437VU** :

R - Press **PACK VALVE 1** and **PACK VALVE 2** pushbutton switches (**OFF** legends go off).

R (d)On **AIR BLEED** section of panel **436VU** :

R - Make certain that **X FEED** pushbutton switch is pressed (**MAN** legend is off).

R - Make certain that **APU BLEED** switch is in **ON** position.

R (e)Pressurize pneumatic system using **APU** :

R - Start-up **APU** (Ref. 49-00-00, P. Block 501).

R (f)Start engines (Ref. 71-00-00, P. Block 501) and keep them at idle.

R (2)Operational test of bleed air system with engines and **APU** in operation.

ACTION	RESULT
R 1. On **ECAM** control panel : R - Press **BLEED** pushbutton switch.	On **R ECAM** display unit, **AIR BLEED** page appears and shows : - **APU** bleed valve symbol : in line green - **X FEED** valve symbol : in line green - **ENG 1** and **ENG 2 BLEED** valve symbol : crossline amber - Pressure and temperature of **APU** air bleed.
R 2. On **AIR BLEED** section of panel **436VU** : R - Place **APU BLEED** switch in **OFF/R** position.	On **R ECAM** display unit, **AIR BLEED** page shows : - **APU** bleed valve symbol : crossline green - **X FEED** valve symbol : crossline green - **ENG 1** and **ENG 2 BLEED** valve symbol : in line green - **ENG 1** and **ENG 2 HP** valve symbol : in line green

	ACTION	RESULT
		- ENG 1 and ENG 2 pressure between 20 and 46 psig - ENG 1 and ENG 2 temperature less than 175°C plus or minus 20°C.
R	3. On throttle control levers : - Increase speed of ENG 1 and ENG 2 up to 35% of N1 (before HP valve closure).	On R ECAM display unit, AIR BLEED page shows : - APU bleed valve symbol : crossline green - X FEED valve symbol : crossline green - ENG 1 and ENG 2 BLEED valve symbol : in line green - ENG 1 and ENG 2 HP valve symbol : in line green - ENG 1 and ENG 2 pressure : 46 psig plus or minus 7 psig - ENG 1 and ENG 2 temperature : 175°C plus or minus 20°C.
R	4. On throttle control levers : - Increase speed of ENG 1 and ENG 2 (step by step) and keep stabilized to obtain HP valve closure.	On R ECAM display unit, AIR BLEED page shows : - APU bleed valve symbol : crossline green - X FEED valve symbol : crossline green - ENG 1 and ENG 2 BLEED valve symbol : in line green - ENG 1 and ENG 2 HP valve symbol : crossline green From the N1 indicator at the main instrument panel : - Record the following parameters : ENG1 N1 ..... % ENG2 N1 ..... % - Check that N1 values are within the limits of the attached HP valve closure table (see NOTE).
R	5. On throttle control levers : - Decrease speed of ENG 1 and ENG 2 to idle.	On R ECAM display unit, AIR BLEED page shows : - APU bleed valve symbol : crossline green - X FEED valve symbol : crossline green - ENG 1 and ENG 2 BLEED valve symbol : in line green

ACTION	RESULT
R	- ENG 1 and ENG 2 HP valve symbol :
R	in line green
	- ENG 1 and ENG 2 pressure between 20 and 46 psig,
	- ENG 1 and ENG 2 temperature less than 175°C plus or minus 20°C.

NOTE : (Ref. Fig. 506).

(4)Close-up

R (a)Stop engines (Ref. 71-00-00, P. Block 501).

R (b)Shut down APU (Ref. 49-00-00, P. Block 501).

R (c)On AIR BLEED section of panel 436VU :

R - Release X FEED pushbutton switch (MAN legend comes on).

R (d)On COMP TEMP panel 437VU :

R - Release PACK VALVE 1 and PACK VALVE 2 pushbutton switches

R (OFF/R legends come on).

R (e)On AIR BLEED section of panel 436VU :

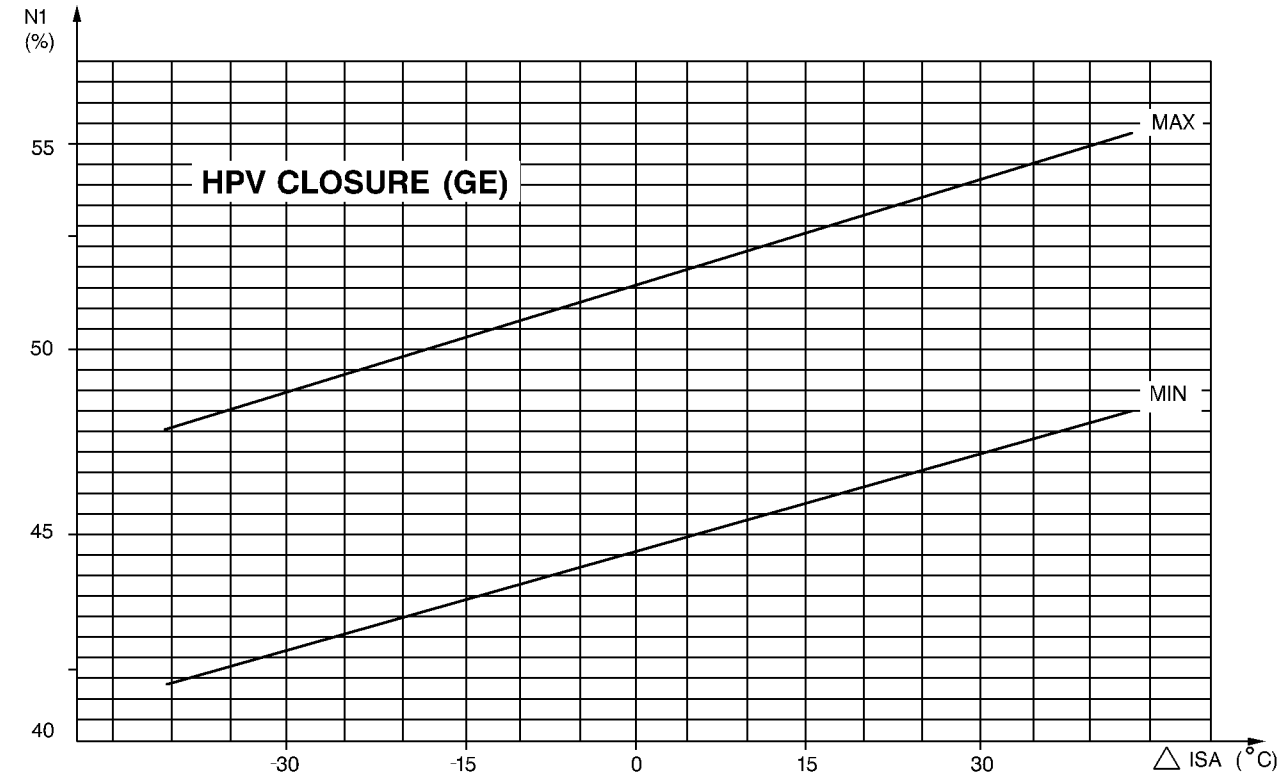
R - Release ENG 1 HP VALVE and ENG 2 HP VALVE pushbutton switches

R (OFF/R legends come on).

R - Release ENG 1 BLEED VALVE and ENG 2 BLEED VALVE pushbutton

R switches (OFF/R legends come on).

(f)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).



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HP/IP Transfer Ratings
Figure 506

ENGINE BLEED AIR SUPPLY SYSTEM - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON ENGINE BLEED AIR SUPPLY SYSTEM, DISPLAY WARNING NOTICES PROHIBITING ENGINE START-UP AND OPERATION OF AIR CONDITIONING, AIR BLEED AND THRUST REVERSER SYSTEMS.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Visual Check of the Following
- (1)Ducts, fasteners and couplings.
- (2)Cable bundles.
- (3)Electrical connectors.
- (4)Accessories and components.
- (5)Correct installation of blow-out disc (a grey disc installed in the air conditioning compartment which provides protection form the effects of overpressure).

R (6)Precooler inlet duct.

B. Leakage Checks at the Following Locations
- (1)High stage pressure sensor sense line.
- (2)Regulator pressure sensor sense line
- (3)Pneumatic system downstream of bleed valve.

R (4)Engine pneumatic system upstream of bleed valves (pressurization by APU
R or via HP ground connectors
R (5)Engine pneumatic system upstream of bleed valves (with engines in
R operation).
R (6)Precooler

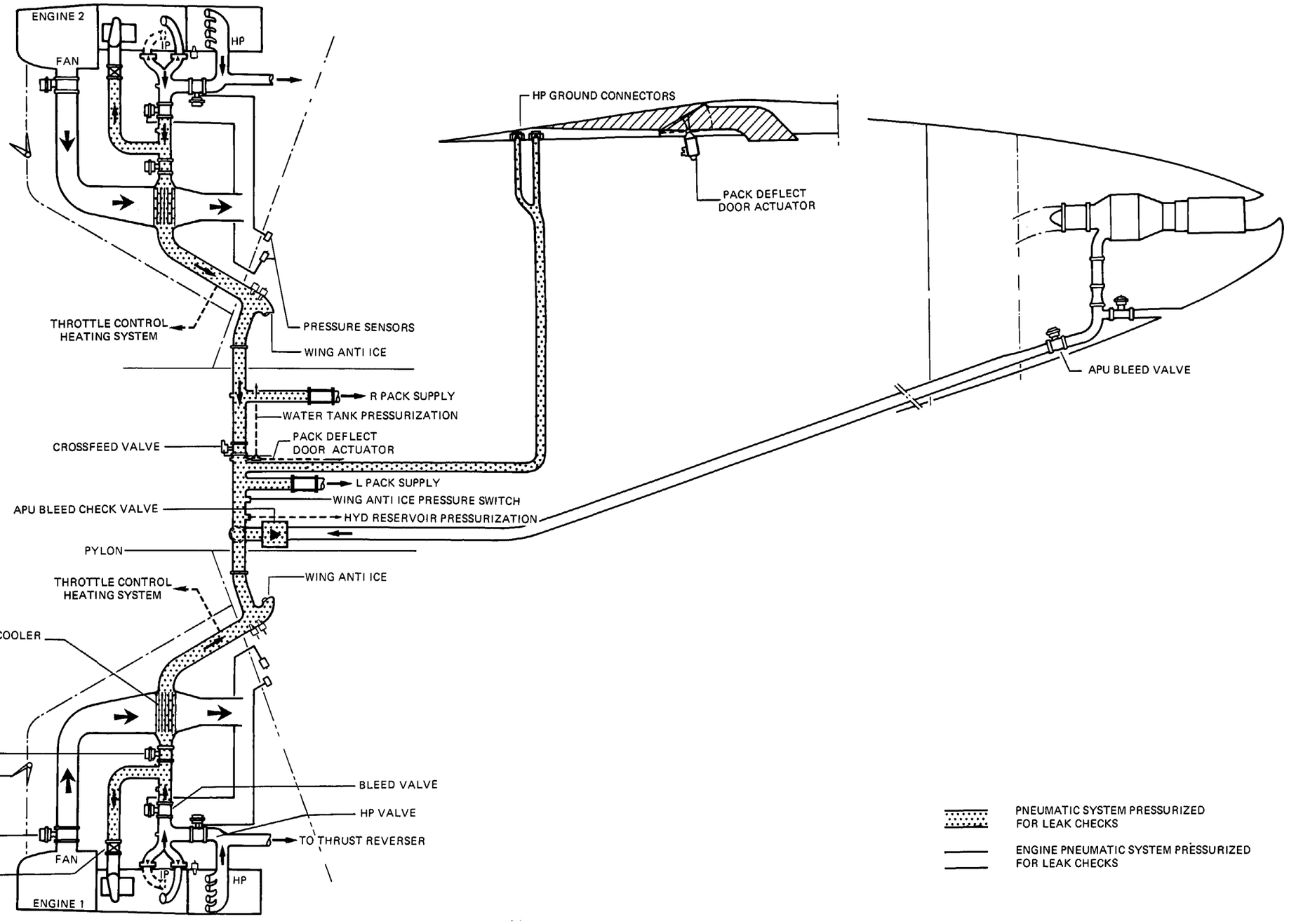
2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m to 4 m (6 ft. 7 in. to 13 ft.).
B.	Warning Notices.
C.	Dry Compressed Air Source (Capable of 0 to 2.1 bars (0 to 30 psi) and a Supply Rate of 5 kg/min. (10 lb/min.) at Ambient Temperature for Pressurization of Pneumatic System through HP Ground Connectors. NOTE : Pressurization may be carried out using the APU.
D.	Dry Compressed Air Source (Capable of 0 to 21 bars (0 to 300 psi) for Leakage Check of high Stage Pressure Sensor Line.

ITEM	DESIGNATION
E.	10X Magnifying Glass
F. 290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
G. 290435-1-1	Adapter - Valve Test
H. 290166	Adapter - Valve Test
J. Material No. 04-014	Common Greases (Ref. 20-31-00)
K. Material No.P05-034	Special Materials (Ref. 70-00-00)
L. Material No.P05-169	Special Materials (Ref. 70-00-00)
M. Material No.P05-289	Special Materials (Ref. 70-00-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 36-11-00, P. Block 401	Engine Bleed Air Supply System
- 36-11-15, P. Block 401	Bleed Air Precooler
- 36-22-00, P. Block 601	Manifold Air Leak Detection
- 71-13-00, P. Block 301	Cowl Doors
- 49-00-00, P. Block 501	Airborne Auxiliary Power
- 27-51-00, P. Block 301	Mechanical and Electrical Control (Flaps)
- 71-00-00, P.Block 201	Power Plant - General

3. Procedure
(Ref. Fig. 601)

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Position access platforms at air conditioning compartment, engines 1 and 2 and left and right inner wing leading edges.
(3)Make certain that flap and slat control lever is in flight notch position and display warning notices prohibiting lever actuation (Ref. 27-51-00, P. Block 301).
(4)Open air conditioning compartment access door 147BZ.
(5)Open access doors under wing leading edges : 512AB to 512KB (612AB to 612KB) and 523AB (623AB).
(6)Open engine pylon access doors : 471AL, 472AR (481AL, 482AR), 413DL (423DL), 413EL (423EL), 413BL, 412DR (423BL, 422DR).
(7)Open cowl doors (Ref. 71-13-00, P. Block 301).
(8)For leakage check of system, downstream of bleed valves, carry out the following additional preparatory operations :
(a)In air conditioning compartment on crossfeed ducting :
- disconnect water system pressurization line and blank off orifice on crossfeed duct.
- disconnect hydraulic reservoir pressurization line and blank off orifice on crossfeed duct.
(b)Initial conditions
- correct electrical power supply
- forward services ventilation system in operation
- panel circuit breakers close, particularly those associated with AIR BLEED and AIR BLEED & COMPT TEMP.



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Air Bleed System
Figure 601

(c)On **COMPT TEMP** panel **437VU**, make certain that :
- **PACK VALVE** 1 and 2 pushbutton switches are released (out) (valves closed) and **FAULT** legends are off.

(d)On **AIR BLEED** section of panel **436VU**
- make certain that **ENG** 1 and **ENG** 2 **BLEED VALVE** Pushbutton switches are released (out) **(OFF/R)**
  . **OFF/R** legends on **ENG** 1 and **ENG** 2 **BLEED VALVE** pushbutton switches come on.
  . Flowbar on **BLEED VALVE** annunciator goes off.
- make certain that **ENG** 1 and **ENG** 2 **HP VALVE** pushbutton switches are released (out) **(OFF)**
  . **OFF** legends on **ENG** 1 and **ENG** 2 **HP VALVE** pushbutton switches come on.
- release **X FEED** mode pushbutton switch **(MAN)**
  . **MAN** legend on **X FEED** mode pushbutton switch comes on.
- **PRESS X FEED** valve position pushbutton switch
  . Flowbar on **X FEED** valve position pushbutton switch is in line.
- make certain that **APU BLEED** switch is in **OFF/R** position
  . Flowbar on **APU BLEED** annunciator is off.

(e)On **ANTI ICE** section of panel **426VU** make certain that :
- **WING/SUPPLY** pushbutton switch is released (out).

(f)Install warning notices prohibiting operation of air bleed system.

(g)On engines :
- make certain that engine 1 and engine 2 bleed valves are not manually locked in closed position (i.e. visual position indicators in **CLOSE** position).

B. Visual Inspection/Check

(1)On the pneumatic system, from the air bleed pick-off on engine through the pylons and air conditioning compartment up to the **APU** bleed check valve, visually check :

(a)For cracks, distortion and leakage in ducts, wing/fuselage feed-through connectors and couplings (clamps, flexible connectors).

(b)For good condition and security of attachment of ducting insulation material.

(c)For leakage (shown by discoloration of adjacent structure, components or electrical wiring).

(d)That wing/fuselage feed-through connectors and duct attachments are correctly installed, clamps correctly tightened (alignment of marks on nuts and trunnions or bolts if marks are available), crack evidence on supports, rods and attachment lugs does not exist and that bonding leads are correctly attached and in good condition.

NOTE : In the absence of marks on the clamps, check torquing of the clamps with a wrench only if doubt subsists or if traces of leakage are evidenced.

(e)That adequate clearance exists between ducts and leading edge ribs and in wing/pylon feed-through zone.

(f)For chafing at elbow duct at pylon-to-wing junction :

1 Between temperature control sensor **53HA (54HA)** and fuel feed line.

2 Between precooler outlet temperature sensor **5HX (4HX)** and feeder wires.

(2)Check cable bundles associated with the system, making certain that they are in good condition ; i.e. clean and exempt from signs of ageing, alteration, heat distress, flaking and distortion which could have an adverse effect on their characteristics.
(3)Check condition of electrical connectors, terminal strips and clamps. Make certain that evidence of corrosion does not exist on connectors and that they are clean, correctly tightened and safetied.
(4)Check system accessories and components, making certain that they are clean and in correct condition and their fasteners correctly safetied.
(5)Visually check that the grey disc (blow-out disc) is correctly installed in its location on access door 147CZ in bulkhead at FR47, left side.
NOTE : The disc shall not be re-used once it has been ejected.
(6)Inspection of precooler inlet duct
(a)Remove bleed air precooler inlet duct (Ref. 36-11-00, P. Block 401).
(b)Perform detailed visual check of the inside and outside of precooler inlet duct using a 10X magnifying glass.
(c)If crack is detected, replace damaged precooler inlet duct by a new precooler inlet duct (Ref. 36-11-00, P. Block 401).

C. Leakage Checks
(1)Engine 1 Engine 2 high stage pressure sensor line.
(a)Disconnect line from HP valve.
(b)Connect a metered air source capable of supplying 0 to 21 bars (0 to 300 psi).
(c)Slowly increase pressure to 20.8 ± 1 bars (300 ± 14 psi) and check for leakage.
(d)Depressurize the line and disconnect air source.
(e)Apply Material No. 04-014 to union threads, connect line to valve and TORQUE coupling to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).
NOTE : Material No. 04-014 to be applied to thread only.
(2)Regulator pressure sensor sense line.
(a)Disconnect pressure sense tube from bleed valve.
(b)Connect a metered air source capable of supplying 0 to 7 bars (0 to 100 psi).
(c)Slowly increase pressure to 3.5 ± 0.3 bars (50 ± 5 psi) and check for leakage.
(d)Depressurize the pressure sense tube and disconnect air source.
(e)Apply Material No. 04-014 to union threads, connect pressure sense tube to valve and TORQUE coupling to between 150 and 175 lbf.in. (1.69 and 1.97 m.daN).
NOTE : Material No. 04-014 to be applied to theard only.
(3)Pneumatic system downstream of bleed valves (Pressurization by APU or via HP ground connectors).
(a)Pressurization via HP ground connector.
1 Open access door 144BR.
2 Connect external air source to one of the HP ground connectors or to the two connectors if required.
3 Turn on air source and slowly increase pressure until stabilized at 2.1 bars (30 psi).
NOTE : At ambient temperature, the rate of supply necessary to maintain pressure at 2.1 bars (30 psi) is 2.5 kg/min. (5.5 lb/

min.) max.

(b)Pressurization by APU

1 Start APU (Ref. 49-00-00, P. Block 501).

2 On AIR BLEED section of panel 436VU :

- place APU BLEED swhitch in ON position
- flowbar on APU BLEED annunciator is ON
- check that PRESS indicator reads between 20 and 30 psi approx.

(c)Check for leakage on test port plugs (1), (2) and (3), shaft seal (4) and any part of bleed valve (Ref. Fig. 602) and on all ducts and sense lines especially at couplings and particularly bleed valve downstream pressure sense line (Ref. 36-22-00, P. Block 601).

(d)Shutdown of pressurization via HP ground connectors.

1 Decrease pressure to zero and disconnect air source.

2 Install cap on ground connector and close access door 144BR.

(e)Shutdown of pressurization by APU.

1 on AIR BLEED section of panel 436VU

- place APU BLEED switch in OFF/R position.
- flowbar on APU BLEED annunciator goes off.

2 Shutdown APU (Ref. 49-00-00, P. Block 501)

(4)Engine pneumatic system upstream of bleed valve (pressurization by APU or HP ground connectors).

(a)Open engine 1 (engine 2) bleed valve as follows :

1 On AIR BLEED section of panel 436VU

- press ENG1 (ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1 (ENG2)/BLEED VALVE pushbutton switch goes off.
- flowbar on BLEED VALVE annunciator comes on.

2 Cut and remove lockwire, remove filter from test port B and install test set adapter R.

3 Cut and remove lockwire, remove plug from test port N and install test set adapter X.

4 Connect test set to the two adapters and pressurize at 3 bars (44 psi) :
check that valve opens (visual position indicator moves to OPEN position).

(b)Pressurization via HP ground connector

1 Open access door 144BR.

2 Connect external air source to one of the HP ground connectors or to the two connectors.

3 Turn on air source and slowly increase pressure until stabilized at 2.1 bars (30 psi).

(c)Pressurization by APU

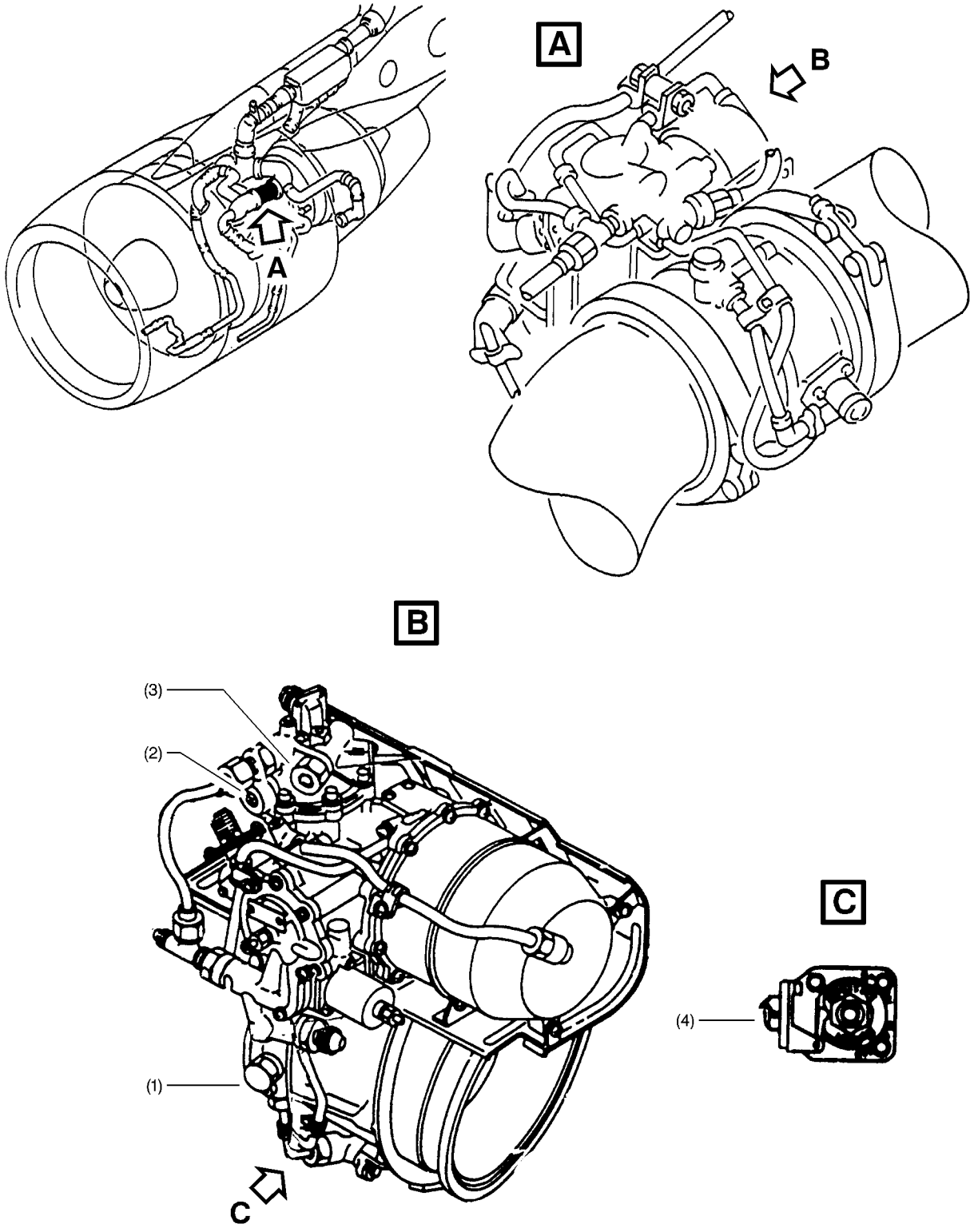
1 Start APU (Ref. 49-00-00, P. Block 501).

2 On AIR BLEED section of panel 436VU

- place APU BLEED switch in ON position.
- flowbar on APU BLEED annunciator comes on.
- check that PRESS indicator reads between 20 and 30 psi.

(d)Check for leakage on test port plugs (1), (2) and (3), shaft seal (4) and any part bleed valve (Ref. Fig. 602) and on all ducts and sense lines especially at couplings and particularly bleed valve downstream pressure sense line (Ref. 36-22-00, P. Block 601).

(e)Shutdown of pressurization via HP ground connectors



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Bleed Valve
Figure 602

1 Decrease pressure to zero and disconnect air source.
2 Install cap on HP ground connector and close access door 144BR.

(f)Shutdown of pressurization by APU.
1 On AIR BLEED section of panel 436VU
- place APU BLEED switch in OFF/R position.
- flowbar on APU BLEED annunciator goes off.
- release ENG1 (ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1 (ENG2)/BLEED VALVE pushbutton switch comes on.
- flowbar on BLEED VALVE annunciator goes off.
2 Shutdown APU (Ref. 49-00-00, P. Block 501).

(g)On engine 1 (engine 2) bleed valve
- decrease pressure to zero
- disconnect air source and remove test set adapters R and X
- check filter seal and replace if necessary, install filter in test port B and wirelock
- check plug O-ring and replace if necessary, install plug in test port N and wirelock.

(5)Engine pneumatic system upstream of bleed valve (with engines in operation)

(a)Prepare the leak test (Ref. Fig. 603)
1 There are three possible procedures to find the location of a pneumatic joint air leak.
a You can apply dry developer (Material No.P05-034) around the pneumatic joint.
NOTE : Apply dry developer only on the connections of the removed pneumatic components. Do not apply dry developer on all the pneumatic components.
b You can apply aluminium foil (Material No. 08-019) method to the pneumatic joints locations.
NOTE : This method is recommended when leak check is performed with hot air.
- Wind the foil wrap around the joint one time.
- Twist the seam of the foil wrap tight.
- Make the foil wrap as tight as possible on the tube but do not rip the wrap.
- Attach the foil wrap at the two sides of the pneumatic joint with lockwire 0.024 in. (0.6 mm) (Material No. 19-018).
- Check that there is no leak :
. If there is a leak, the foil installed on the duct breaks or becomes too hot.
c Temperature template method
NOTE : This method is recommended when leak check is performed with hot air and if no leak have been detected with aluminium foil method. This method is used to detect smallest leaks.
- Install temperature template along the inspected duct.
- Check the temperature template after next flight to identify areas the most hot.

(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(c)Close engine cowls (Ref. 71-13-00, P.Block 301).

(d)Pressurization by the engines
1 Start the related engine (Ref. 71-00-00, P.Block 201).
2 On AIR BLEED section of panel 436VU :
- press ENG1(ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1(ENG2)/BLEED VALVE pushbutton switch goes off.
- flowbar on BLEED VALVE annunciator comes on.
- check that PRESS indicator reads between 20 and 30 psi.
(e)Shutdown of pressurization by the engines
1 Shutdown the related engine (Ref. 71-00-00, P.Block 201).
2 On AIR BLEED section of panel 436VU :
- press ENG1(ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1(ENG2)/BLEED VALVE pushbutton switch come on.
(f)Open engine cowls (Ref. 71-13-00, P.Block 301).
NOTE : Make sure that the engine shutdown occured not less than 5 minutes before you do this procedure.
(g)Make sure that there are no leaks at the bleed valve on the related engine.
(h)Put the aircraft back to its initial configuration.
(6)Precooler (pressurization by APU)
NOTE : This procedure applies after a precooler leak has been identified by sound to assess degradation of precooler performance.
(a)Make certain pneumatic system is cold with LH/RH precooler outlet temperature indication below 50°C.
(b)Start APU (Ref. 49-00-00, P. Block 501).
(c)On AIR BLEED section of panel 436VU :
- place APU BLEED switch in ON position.
- flowbar on APU BLEED annunciator comes on.
- check that PRESS indicator reads between 20 and 30 psi.
(d)Wait 10 ± 2 min.
(e)Record LH/RH precooler outlet temperature.
1 With a temperature difference < 20°C the leak remains acceptable and the precooler can be considered fully serviceable. Nevertheless, it is recommended to schedule precooler replacement at the next night stop opportunity at main base.
2 With a temperature difference > 20°C the leaking precooler (side having the higher temperature indication) must be replaced (Ref. 36-11-15, P. Block 401).
NOTE : LH/RH precooler temperature will tend to equalize if check is performed on a hot pneumatic system or if temperatures are recorded too late.
(f)Shutdown of pressurization by APU
1 On AIR BLEED section of panel 436VU
- place APU BLEED switch in OFF/R position
- flowbar on APU BLEED annunciator goes off
- release ENG1(2)/BLEED VALVE pushbutton switch
- OFF/R legend on ENG1(2)/BLEED VALVE pushbutton switch comes on
- flowbar on BLEED VALVE annunciator goes off.
2 Shutdown APU (Ref. 49-00-00, P. Block 501).

D. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).

(2)In air conditioning compartment on crossfeed ducting :
- remove blanking plugs/caps and connect water system pressurization line and hydraulic reservoir pressurization line to crossfeed duct.

(3)Close access door.

CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/PANELS AT FR47.

(a)Close air conditioning compartment access door 147BZ.

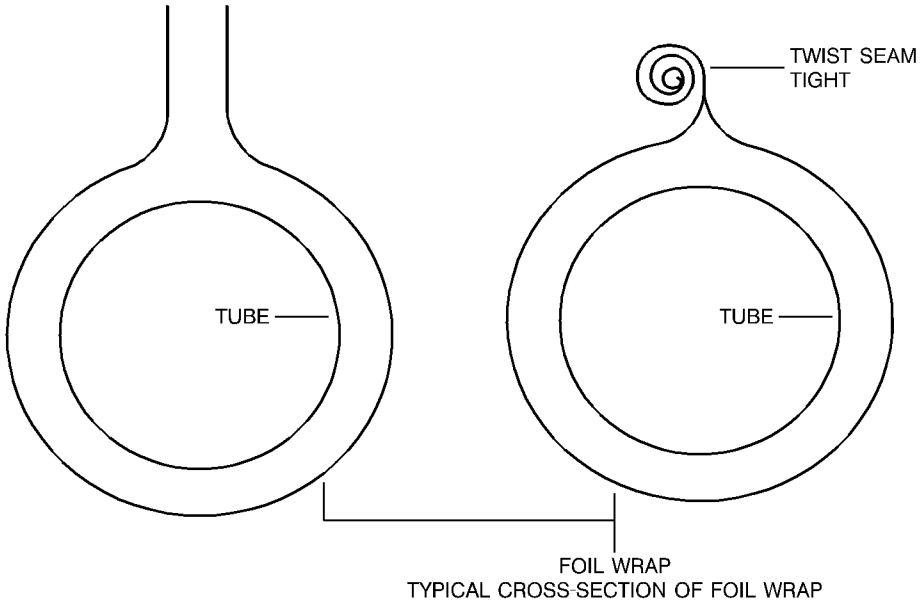
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

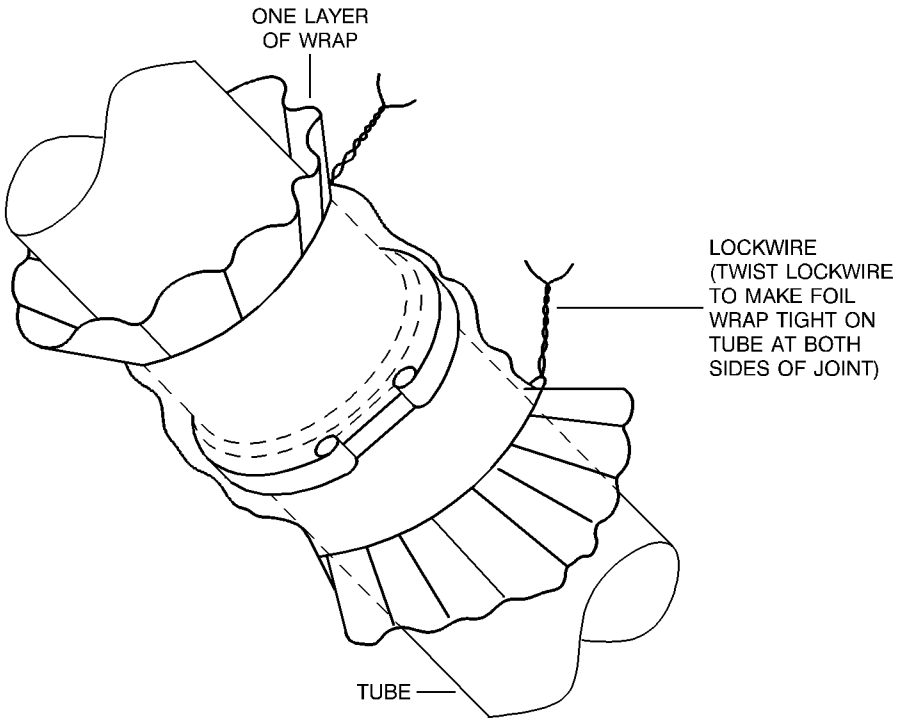
(5)Close engine cowls (Ref. 71-13-00, P. Block 301).

(6)Close all access doors in pylon, wing leading edges and air conditioning compartment.

(7)Remove warning notices.

(8)Remove all ground handling and maintenance equipment, standard and special tools together with ground power equipment, all access equipment and miscellaneous items.





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Foil Wrap Installation at Pneumatic System Joints
Figure 603

ENGINE BLEED AIR SUPPLY SYSTEM - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON ENGINE BLEED AIR SUPPLY SYSTEM, DISPLAY WARNING NOTICES PROHIBITING ENGINE START-UP AND OPERATION OF AIR CONDITIONING, AIR BLEED AND THRUST REVERSER SYSTEMS.

BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

1. Reason for the Job

A. Visual Check of the Following
- (1)Ducts, fasteners and couplings.
- (2)Cable bundles.
- (3)Electrical connectors.
- (4)Accessories and components.
- (5)Correct installation of blow-out disc (a grey disc installed in the air conditioning compartment which provides protection form the effects of overpressure).
- (6)Precooler inlet duct.

B. Leakage Checks at the Following Locations
- (1)High stage pressure sensor sense line.
- (2)Regulator pressure sensor sense line
- (3)Pneumatic system downstream of bleed valve
- (4)Engine pneumatic system upstream of bleed valves (pressurization by APU or via HP grand connectors)
- (5)Engine pneumatic system upstream of bleed valves (with engines in operation).
- (6)Precooler

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2 m to 4 m (6 ft. 7 in. to 13 ft.).
B.	Warning Notices.
C.	Dry Compressed Air Source (Capable of 0 to 2.1 bars (0 to 30 psi) and a Supply Rate of 5 kg/min. (10 lb/min.) at Ambient Temperature for Pressurization of Pneumatic System through HP Ground Connectors. NOTE : Pressurization may be carried out using the APU.
D.	Dry Compressed Air Source (Capable of 0 to 21 bars (0 to 300 psi) for Leakage Check of high Stage Pressure Sensor Line.
E.	10X Magnifying Glass

ITEM	DESIGNATION
F. 290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
G. 290435-1-1	Adapter - Valve Test
H. 290166	Adapter - Valve Test
J. Material No. 04-014	Common Greases (Ref. 20-31-00)
K. Marerial No. 08-019	Bonding and Adhesive Compounds (Ref. 20-31-00)
L. Material No. C05-061	Bonding and Adhesive Compounds (Ref. 70-00-00)
M. Material No. C10-071	Bondinf and adhesive Compounds (Ref. 70-00-00)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 36-11-00, P. Block 401	Engine Bleed Air Supply System
- 36-11-15, P. Block 401	Bleed Air Precooler
- 36-22-00, P. Block 601	Manifold Air Leak Detection
- 71-13-00, P. Block 301	Cowl Doors
- 49-00-00, P. Block 501	Airborne Auxiliary Power
- 27-51-00, P. Block 301	Mechanical and Electrical Control (Flaps)
- 71-00-00, P. Block 501	Power Plant - General

**ON A/C 001-100,

Post SB 36-2030 For A/C 001-100,

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A.	Access Platform 2 m to 4 m (6 ft. 7 in. to 13 ft.).
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R 3792195-1	Test Set - Valve Actuating
G. 290435-1-1	Adapter - Valve Test
H. 290166	Adapter - Valve Test
J. Material No. 04-014	Common Greases (Ref. 20-31-00)
K. Material No. 08-019	Bonding and Adhesive Compounds (Ref. 20-31-00)
L. Material No. 11-003	Cleaning Agents (Ref. 20-31-00)
M Material No. C05-061	Bonding and Adhesive Compounds (Ref. 70-00-00)
N. Material No. C10-071	Bonding and adhesive Compounds (Ref. 70-00-00)
Referenced Procedures	
- 20-23-11, P. Block 1	Installation and Repair of Turbing
- 24-41-00, P. Block 301	AC External Power Control
- 27-51-00, P. Block 301	Mechanical and Electrical Control (Flaps)
- 36-11-00, P. Block 401	Engine Bleed Air Supply System
- 36-11-15, P. Block 401	Bleed Air Precooler
- 36-22-00, P. Block 601	Manifold Air Leak Detection
- 49-00-00, P. Block 501	Airbone Auxiliary Power
- 71-13-00, P. Block 301	Cowl Doors
- 71-00-00, P. Block 501	Power Plant - General

**ON A/C 001-100,

(Ref. Fig. 601)

3. Procedure

A. Job Set-Up

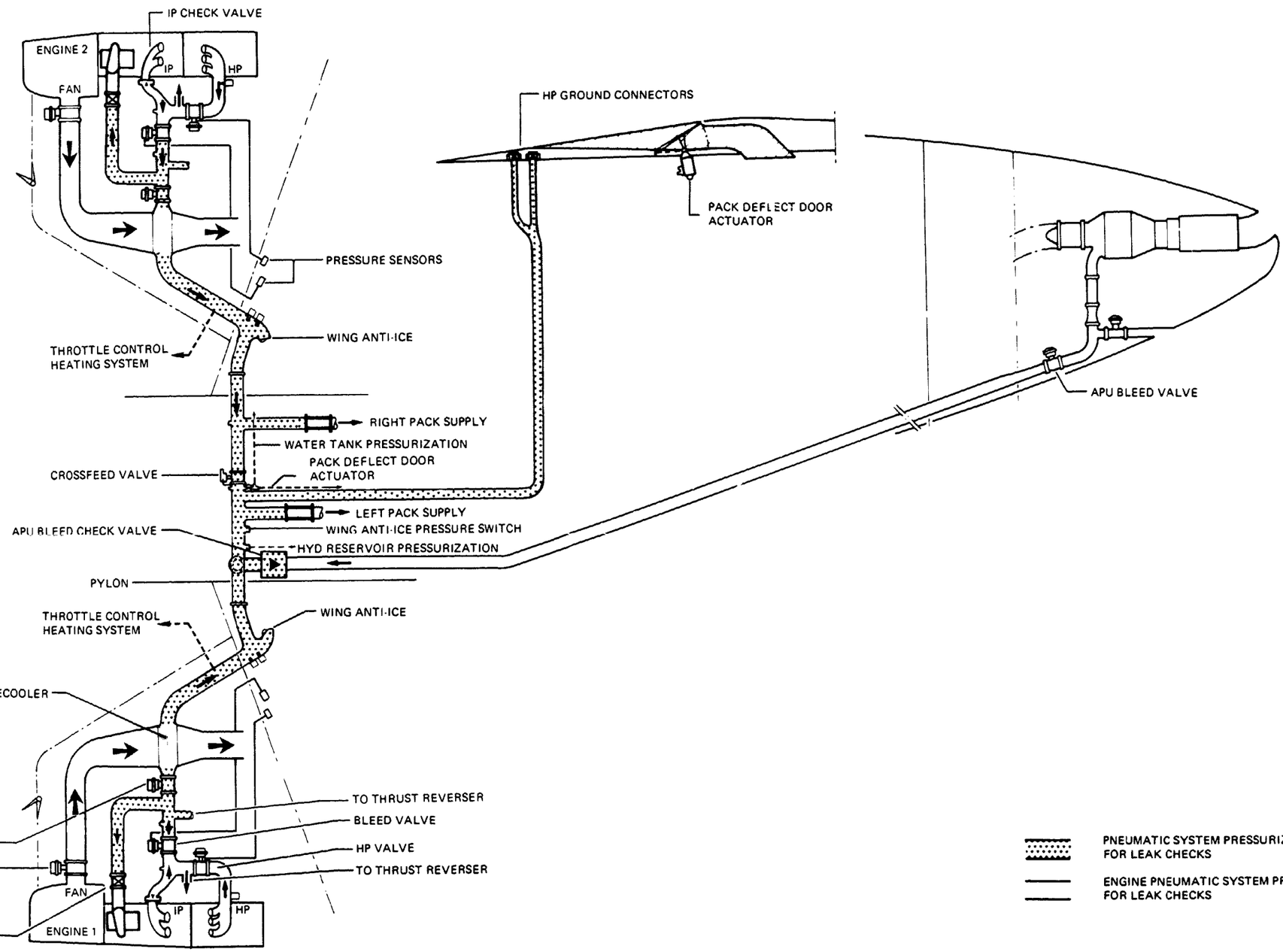
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(2)Position access platforms at air conditioning compartment, engines 1 and 2, and left and right inner wing leading edges.

(3)Make certain that flap and slat control lever is in flight notch position and display warning notices prohibiting lever actuation (Ref. 27-51-00,

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Air Bleed System
Figure 601

P. Block 301).
(4)Open air conditioning compartment access door 147BZ.
(5)Open access doors under wing leading edges : 512AB to 512KB (612AB to 612KB) and 523AB (623AB).
(6)Open engine pylon access doors : 471AL, 472AR (481AL, 482AR), 413DL (423DL), 413EL (423EL), 413BL, 412DR (423BL, 422DR).
(7)Open cowl doors (Ref. 71-13-00, P. Block 301).
(8)For leakage check of system, downstream of bleed valves, carry out the following additional preparatory operations :
(a)In air conditioning compartment on crossfeed ducting :
- disconnect water system pressurization line and blank off orifice on crossfeed duct.
- disconnect hydraulic reservoir pressurization line and blank off orifice on crossfeed duct.

(b)Initial conditions
- correct electrical power supply
- forward services ventilation system in operation
- panel circuit breakers close, particularly those associated with AIR BLEED and AIR BLEED & COMPT TEMP.

(c)On COMPT TEMP panel 437VU, make certain that :
- PACK VALVE 1 and 2 pushbutton switches are released (out) (valves closed) and FAULT legends are off.

(d)On AIR BLEED section of panel 436VU
- make certain that ENG 1 and ENG 2 BLEED VALVE pushbutton switches are released (out) (OFF/R)
  . OFF/R legends on ENG 1 and ENG 2 BLEED VALVE pushbutton switches come on.
  . Flowbar on BLEED VALVE annunciator goes off.
- make certain that ENG 1 and ENG 2 HP VALVE pushbutton switches are released (out) (OFF)
  . OFF legends on ENG 1 and ENG 2 HP VALVE pushbutton switches come on.
- release X FEED mode pushbutton switch (MAN)
  . MAN legend on X FEED mode pushbutton switch comes on.
- PRESS X FEED valve position pushbutton switch
  . Flowbar on X FEED valve position pushbutton switch is in line.
- make certain that APU BLEED switch is in OFF/R position
  . Flowbar on APU BLEED annunciator is off.

(e)On ANTI ICE section of panel 426VU make certain that :
- WING/SUPPLY pushbutton switch is released (out).

(f)Install warning notices prohibiting operation of air bleed system.
(g)On engines :
- make certain that engine 1 and engine 2 bleed valves are not manually locked in closed position (i.e. visual position indicators in CLOSE position).

B. Visual Inspection/Check
(1)On the pneumatic system, from the air bleed pick-off on engine through the pylons and air conditioning compartment up to the APU bleed check valve, visually check :
(a)For cracks, distortion and leakage in ducts, wing/fuselage feed-through

connectors and couplings (clamps, flexible connectors).

(b)For good condition and security of attachment of ducting insulation material.

(c)For leakage (shown by discoloration of adjacent structure, components or electrical wiring).

(d)That wing/fuselage feed-through connectors and duct attachments are correctly installed, clamps correctly tightened (alignment of marks on nuts and trunnions or bolts if marks are available), crack evidence on supports, rods and attachment lugs does not exist, and that bonding leads are correctly attached and in good condition.

NOTE : In the absence of marks on the clamps, check torquing of the clamps with a wrench only if doubt subsists or if traces of leakage are evidenced.

(e)That adequate clearance exists between ducts and leading edge ribs and in wing/pylon feed-through zone.

(f)For chafing at elbow duct at pylon-to-wing junction :

1 Between temperature control sensor 53HA (54HA) and fuel feed line.

2 Between precooler outlet temperature sensor 5HX (4HX) and feeder wires.

(2)Check cable bundles associated with the system, making certain that they are in good condition ; i.e. clean and exempt from signs of ageing, alteration, heat distress, flaking and distortion which could have an adverse effect on their characteristics.

(3)Check condition of electrical connectors, terminal strips and clamps. Make certain that evidence of corrosion does not exist on connectors and that they are clean, correctly tightened and safetied.

(4)Check system accessories and components, making certain that they are clean and in correct condition and their fasteners correctly safetied.

(5)Visually check that the grey disc (blow-out disc) is correctly installed in its location on access door 147CZ in bulkhead at FR47, left side.

NOTE : The disc shall not be re-used once it has been ejected.

R (6)Check to make sure that the 14th-Stage Manifold aligns with the
R engine ports.
R (a)Attach the 14th-stage manifold to the engine ports with the seals and
R couplings (Ref. Fig. 603).
R (b)Tighten the center coupling sufficient to hold the 14th-stage manifold
R in position. DO NOT TORQUE at this time.
R (c)Remove the couplings from the upper and lower engine ports.
R (d)Check the gap and off-set of the 14th-stage manifold at the upper
R and lower engine ports (Ref. Fig. 603).
R 1 Maximum GAP allowed is 0.020 in. (0.508 mm).
R 2 Maximum alignment OFF-SET allowed is 0.060 in. (1.524 mm).
R (e)If the 14th-stage manifold is NOT IN the above limits, replace the
R 14th-stage manifold.

R (7)Inspection of precooler inlet duct

(a)Remove bleed air precooler inlet duct (Ref. 36-11-00, P. Block 401).

(b)Perform detailed visual ckeck of the inside and outside of precooler inlet duct using a 10X magnifying glass.

(c)If crack is detected, replace damaged precooler inlet duct by a new precooler inlet duct (Ref. 36-11-00, P. Block 401).

**ON A/C 001-100,

Post SB 36-2030 For A/C 001-100,

R (8)Inspection of precooler inlet duct
(a)Remove bleed air precooler inlet duct (Ref. 36-11-00, P. Block 401).
(b)Clean precooler inlet duct with Material No. 11-003.
(c)Perform detailed visual ckeck of the inside and outside of precooler inlet duct using a 10X magnifying glass.
(d)If crack is detected, replace damaged precooler inlet duct by a new precooler inlet duct (Ref. 36-11-00, P. Block 401).
(e)Inspect adjacent hydraulic pipes. If chafing is detected, repair (Ref. 20-23-11, P. Block 1) and clean pylon (Ref. SRM 51-40-16).
(f)Install bleed air precooler inlet duct (Ref. 36-11-00, P. Block 401).
CAUTION : MAKE SURE THAT PRECOOLER IS CORRECTLY INSTALLED ON SLEEVE.

**ON A/C 001-100,

C. Leakage Checks
(1)Engine 1 Engine 2 high stage pressure sensor line.
(a)Disconnect line from HP valve.
(b)Connect a metered air source capable of supplying 0 to 21 bars (0 to 300 psi).
(c)Slowly increase pressure to 20.8 ± 1 bars (300 ± 14 psi) and check for leakage.
(d)Depressurize the line and disconnect air source.
(e)Apply Material No. 04-014 to union threads, connect line to valve and TORQUE coupling to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).
NOTE : Material No. 04-014 to be applied to thread only.
(2)Regulator pressure sensor sense line.
(a)Disconnect pressure sense tube from bleed valve.
(b)Connect a metered air source capable of supplying 0 to 7 bars (0 to 100 psi).
(c)Slowly increase pressure to 3.5 ± 0.3 bars (50 ± 5 psi) and check for leakage.
(d)Depressurize the pressure sense tube and disconnect air source.
(e)Apply Material No. 04-014 to union threads, connect pressure sense tube to valve and TORQUE coupling to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).
NOTE : Material No. 04-014 to be applied to theard only.
(3)Pneumatic system downstream of bleed valves (Pressurization by APU or via HP ground connectors).
(a)Pressurization via HP ground connector.
1 Open access door 144BR.
2 Connect external air source to one of the HP ground connectors or to the two connectors if required.
3 Turn on air source and slowly increase pressure until stabilized at 2.1 bars (30 psi).

NOTE : At ambient temperature, the rate of supply necessary to maintain pressure at 2.1 bars (30 psi) is 2.5 kg/min. (5.5 lb/min.) max.

(b)Pressurization by APU
1 Start APU (Ref. 49-00-00, P. Block 501).
2 On AIR BLEED section of panel 436VU :
- place APU BLEED swhitch in ON position
- flowbar on APU BLEED annunciator is ON
- check that PRESS indicator reads between 20 and 30 psi approx.

(c)Check for leakage on all ducts and sense lines especially at couplings and particularly bleed valve downstream pressure sense line (Ref. 36-22-00, P. Block 601).

(d)Shutdown of pressurization via HP ground connectors.
1 Decrease pressure to zero and disconnect air source.
2 Install cap on ground connector and close access door 144BR.

(e)Shutdown of pressurization by APU.
1 on AIR BLEED section of panel 436VU
- place APU BLEED switch in OFF/R position.
- flowbar on APU BLEED annunciator goes off.

2 Shutdown APU (Ref. 49-00-00, P. Block 501)

(4)Engine pneumatic system upstream of bleed valve (pressurization by APU or HP ground connectors).

(a)Open engine 1 (engine 2) bleed valve as follows :
1 On AIR BLEED section of panel 436VU
- press ENG1 (ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1 (ENG2)/BLEED VALVE pushbutton switch goes off.
- flowbar on BLEED VALVE annunciator comes on.

2 Cut and remove lockwire, remove filter from test port B and install test set adapter R.
3 Cut and remove lockwire, remove plug from test port N and install test set adapter X.
4 Connect test set to the two adapters and pressurize at 3 bars (44 psi) :
check that valve opens (visual position indicator moves to OPEN position).

(b)Pressurization via HP ground connector
1 Open access door 144BR.
2 Connect external air source to one of the HP ground connectors or to the two connectors.
3 Turn on air source and slowly increase pressure until stabilized at 2.1 bars (30 psi).

(c)Pressurization by APU
1 Start APU (Ref. 49-00-00, P. Block 501).
2 On AIR BLEED section of panel 436VU
- place APU BLEED switch in ON position.
- flowbar on APU BLEED annunciator comes on.
- check that PRESS indicator reads between 20 and 30 psi.

(d)Check for leakage on all ducts and sense lines especially at couplings (Ref. 36-22-00, P. Block 601).

(e)Shutdown of pressurization via HP ground connectors
1 Decrease pressure to zero and disconnect air source.

2 Install cap on HP ground connector and close access door 144BR.

(f)Shutdown of pressurization by APU.

1 On AIR BLEED section of panel 436VU
- place APU BLEED switch in OFF/R position.
- flowbar on APU BLEED annunciator goes off.
- release ENG1 (ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1 (ENG2)/BLEED VALVE pushbutton switch comes on.
- flowbar on BLEED VALVE annunciator goes off.

2 Shutdown APU (Ref. 49-00-00, P. Block 501).

(g)On engine 1 (engine 2) bleed valve
- decrease pressure to zero
- disconnect air source and remove test set adapters R and X
- check filter seal and replace if necessary, install filter in test port B and wirelock
- check plug O-ring and replace if necessary, install plug in test port N and wirelock.

(5)Engine pneumatic system upstream of bleed valve (with engines in operation)

(a)Prepare the leak test (Ref. Fig. 602)

1 There are three possible procedures to find the location of a pneumatic joint air leak.

a You can apply dry developer (Material No. C05-061) around the pneumatic joint.

NOTE : Apply dry developer only on the connections of the removed pneumatic components. Do not apply dry developer on all the pneumatic components.

b You can apply aluminium foil (Material No. 08-019) method to the pneumatic joints locations.

NOTE : This method is recommended when leak check is performed with hot air.

- Wind the foil wrap around the joint one time.
- Twist the seam of the foil wrap tight.
- Make the foil wrap as tight as possible on the tube but do not rip the wrap.
- Attach the foil wrap at the two sides of the pneumatic joint with lockwire 0.024 in. (0.6 mm) (Material No. 19-018).
- Check that there is no leak :
  . If there is a leak, the foil installed on the duct breaks or becomes too hot.

c Temperature template method

NOTE : This method is recommended when leak check is performed with hot air and if no leak have been detected with aluminium foil method. This method is used to detect smallest leaks.

- Install temperature template along the inspected duct.
- Check the temperature template after next flight to identify areas the most hot.

(b)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.

(c)Close cowl doors (Ref. 71-13-00, P. Block 301).

(d)Pressurization by the engines

1 Do an engine run (Ref. 71-00-00, P. Block 501).
2 On AIR BLEED section of panel 436VU :
a press ENG1(ENG2)/BLEED VALVE pushbutton switch.
b OFF/R legend on ENG1(ENG2)/BLEED VALVE pushbutton switch goes off.
c flowbar on BLEED VALVE annunciator comes on.
d check that PRESS indicator reads between 20 and 30 psi.

(e)Shutdown of pressurization by the engines
1 Shutdown the related engine (Ref. 71-00-00, P. Block 501).
2 On AIR BLEED section of panel 436VU :
- press ENG1(ENG2)/BLEED VALVE pushbutton switch.
- OFF/R legend on ENG1(EN2G)/BLEED VALVE pushbutton switch come on.

(f)Open cowl doors (Ref. 71-13-00, P. Block 301).
NOTE : Make sure that the engine shutdown occured not less than 5 minutes before you do this procedure.

(g)Make sure that there are no leaks at the bleed valve on the related engine.

(h)Put the aircraft back to its initial configuration.

(6)Precooler (pressurization by APU)
NOTE : This procedure applies after a precooler leak has been identified by sound to access degradation of precooler performance.

(a)Make certain pneumatic system is cold with LH/RH precooler outlet temperature indication below 50°C.

(b)Start APU (Ref. 49-00-00, P. Block 501).

(c)On AIR BLEED section of panel 436VU
- place APU BLEED switch in ON position
- flowbar on APU BLEED annunciator comes on
- check that PRESS indicator reads between 20 and 30 psi.

(d)Wait 10 ± 2 mn.

(e)Record LH/RH precooler outlet temperature.
1 With a temperature difference < 20°C the leak remains acceptable and the precooler can be considered fully serviceable. Nevertheless, it is recommended to schedule precooler replacement at the next night shop opportunity at main base.
2 With a temperature difference > 20°C the leaking precooler (side having the higher temperature indication) must be replaced (Ref. 36-11-15, P. Block 401).
NOTE : LH/RH precooler temperature will tend to equalize if check is performed on a hot pneumatic system or if temperatures are recorded too late.

(f)Shut down of pressurization by APU
1 On AIR BLEED section of panel 436VU
- place APU BLEED switch in OFF/R position
- flowbar on APU BLEED annunciator goes off
- release ENG 1(2)/BLEED VALVE pushbutton switch
- OFF/R legend on ENG 1(2)/BLEED VALVE pushbutton switch comes on
- flowbar on BLEED VALVE annunciator goes off.
2 Shut down APU (Ref. 49-00-00, P. Block 501)

D. Close-Up
(1)De-energize the aircraft electrical network (Ref. 24-41-00,

P. Block 301).

(2)In air conditioning compartment on crossfeed ducting :
- remove blanking plugs/caps and connect water system pressurization line and hydraulic reservoir pressurization line to crossfeed duct.

(3)Close access door.

CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS DOORS/PANELS AT FR47.

(a)Close air conditioning compartment access door 147BZ.

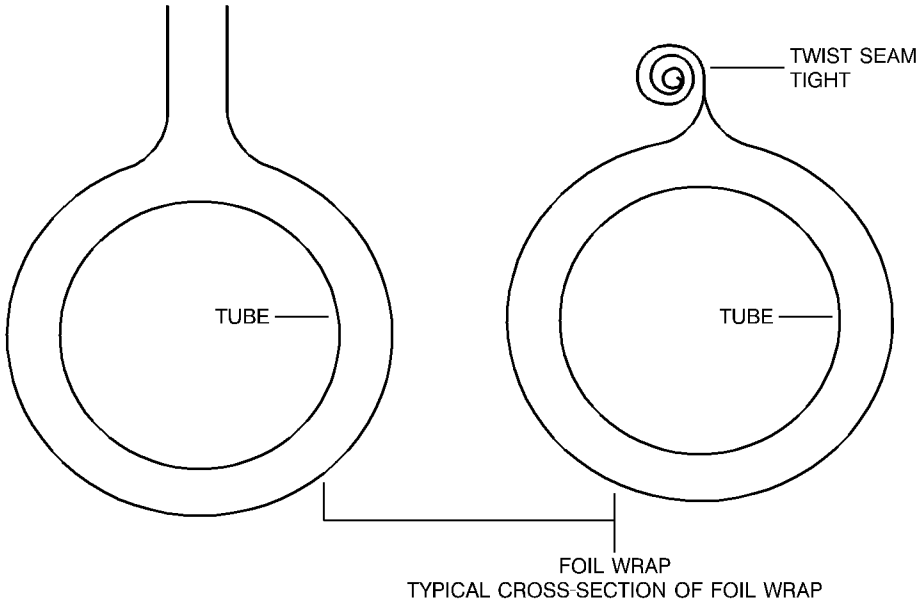
(4)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

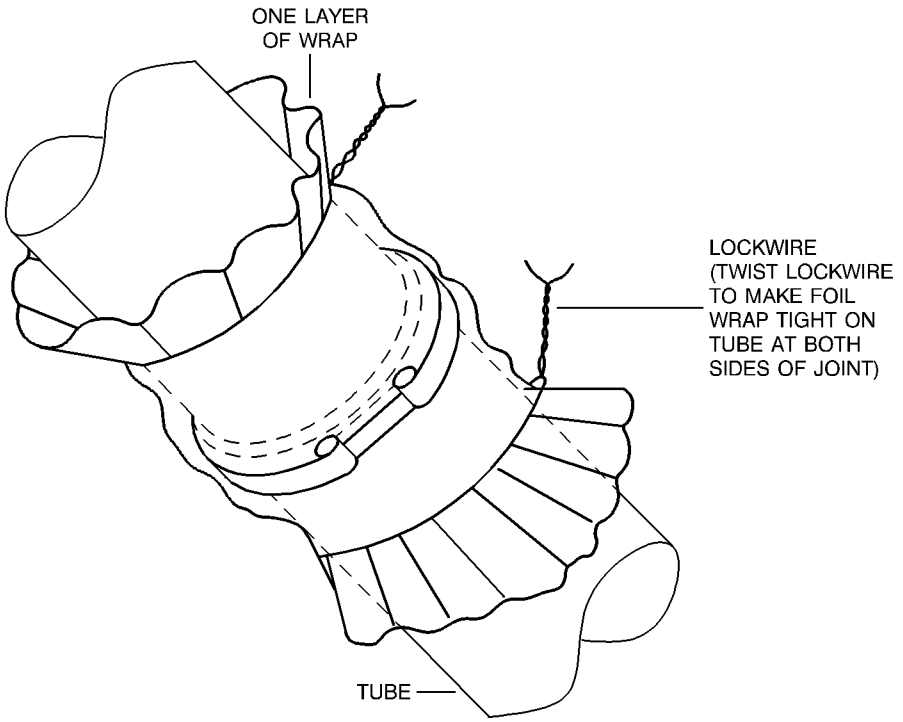
(5)Close engine cowls (Ref. 71-13-00, P. Block 301).

(6)Close all access doors in pylon, wing leading edges and air conditioning compartment.

(7)Remove warning notices.

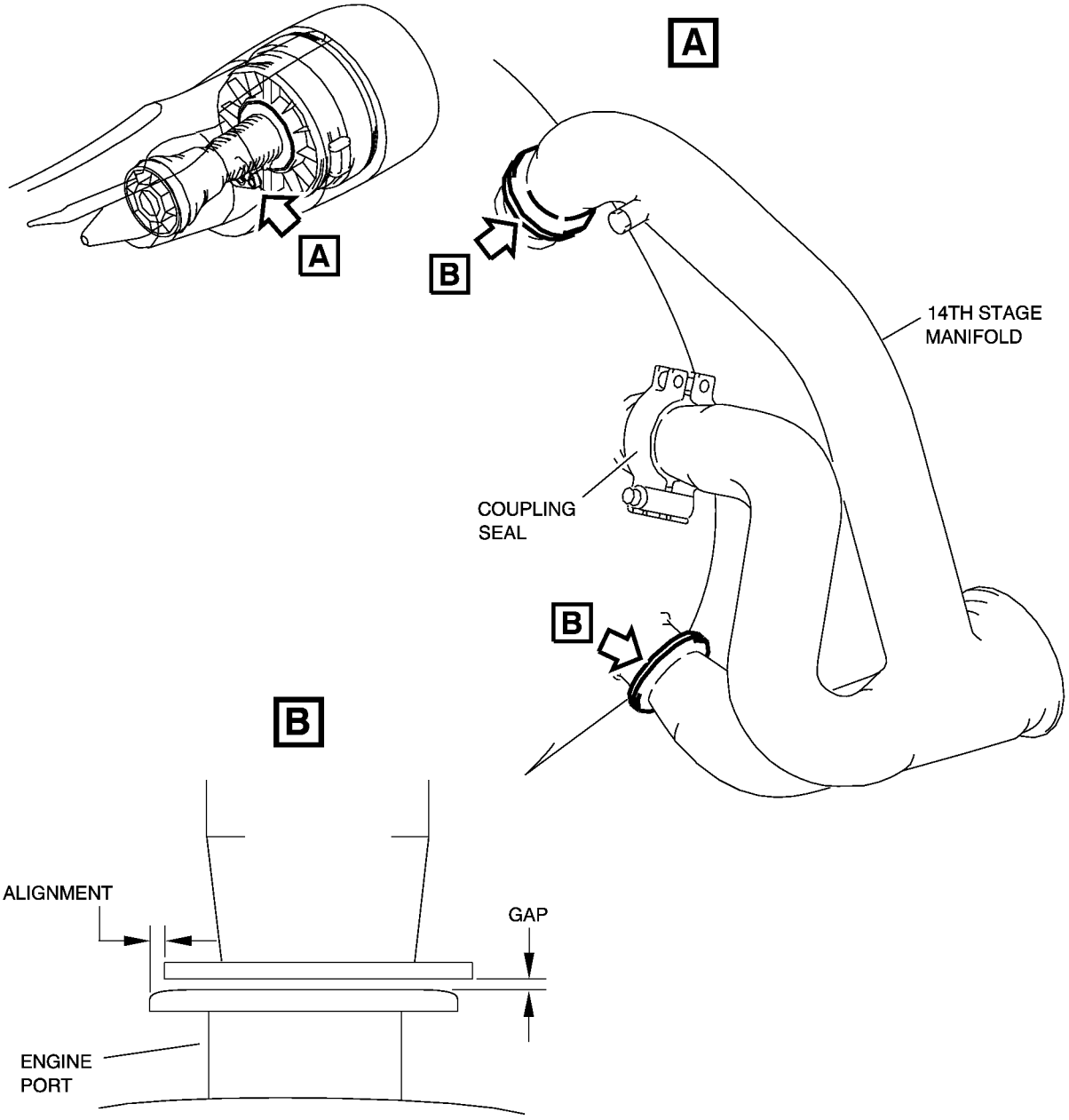
(8)Remove all ground handling and maintenance equipment, standard and special tools together with ground power equipment, all access equipment and miscellaneous items.





BM5 36 11 00 6 AFM0 00

Foil Wrap Installation and Pneumatic System Joints
Figure 602



BM5 36 11 00 6 AGM0 00

14th-Stage Manifold Check
Figure 603

R

HP VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF APPROPRIATE ENGINE
. PRESSURIZATION OF PNEUMATIC SYSTEM.

NOTE : For information related to Inspection/Check of hoses, tubes and ducts (Ref. 36-11-00. P. Block 601).

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Torque Wrench - 115 - 300 lbf.in. (1.30 - 3.40 m.daN)
C.	Warning Notices
D.	Circuit Breaker Safety Clips
E.	Blanking Plugs/Caps
F.	Aluminum Foil
G. RSE1202	Spanner Set
H. Material No.C05-061	Special Materials (Ref. 70-00-00)
J. Material No.C10-071	Special Materials (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-00, P. Block 501	Engine Bleed Air Supply System
- 36-11-00, P. Block 601	Engine Bleed Air Supply System
- 71-00-00, P. Block 501	Power Plant

2. Procedure

A. Job Set-Up
(1)On AIR BLEED section of panel 436VU :
(a)Make sure that X FEED valve position pushbutton switch is released (out).
(b)Make sure that APU BLEED switch is in OFF/R position.
(c)Put a warning notice to tell persons not to operate engine bleed air system.
(2)Put warning notice on HP ground connector access door 144BR to tell persons not to pressurize pneumatic system.
(3)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED & COMPT TEMP/ENG1 CONTROLLER/ MONITOR	5HA	209/A17
22VU	AIR BLEED & COMPT TEMP/ENG1 CONTROLLER/ CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/ENG2/VALVE/HP	4HA	312/G53

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/ENG2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/MONITOR	6HA	315/D54

(4)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(5)Position access platform.

B. Removal

**ON A/C 004-100,

(Ref. Fig. 401)

**ON A/C 001-003,

(Ref. Fig. 402)

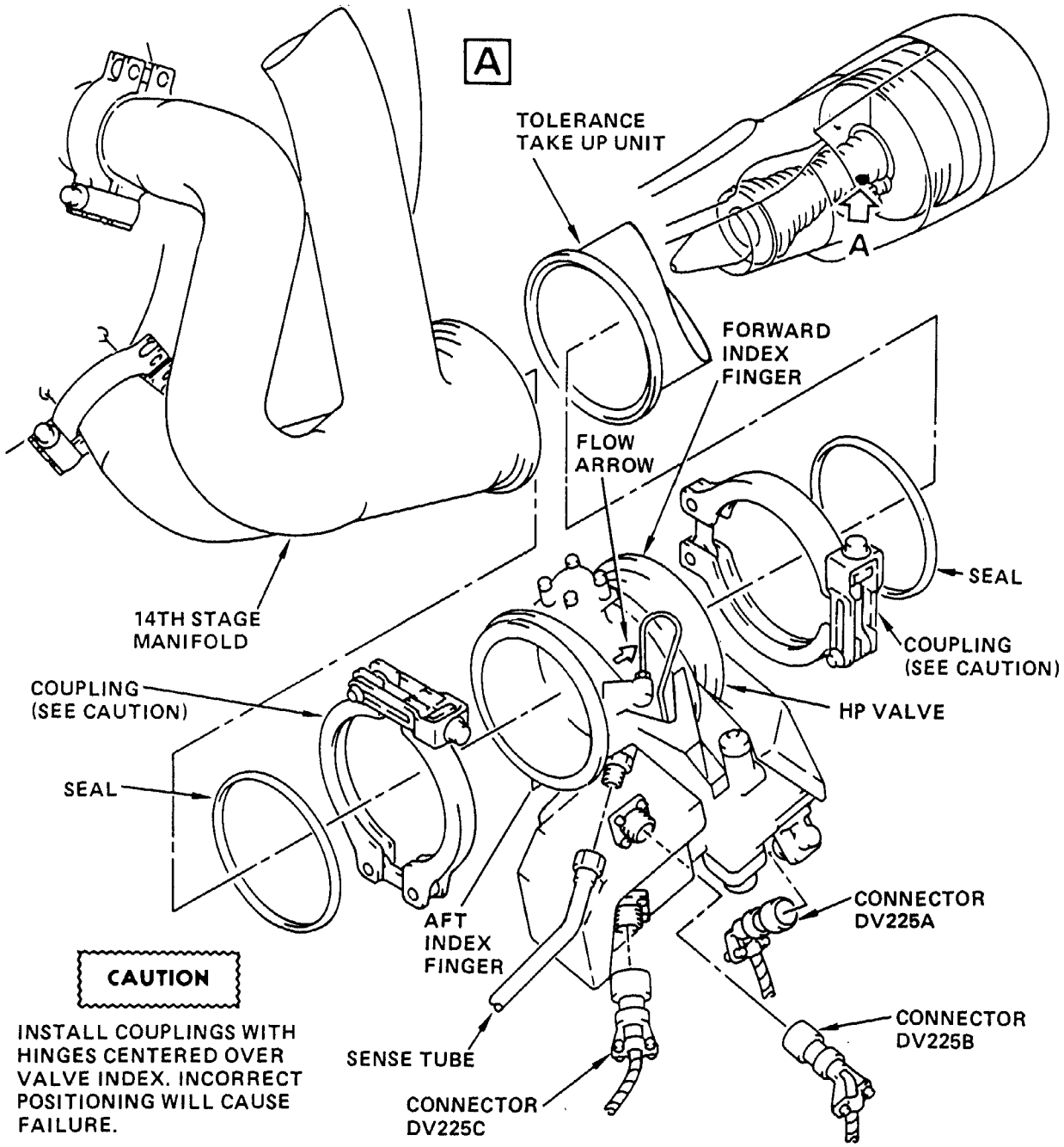
**ON A/C 001-100,

(1)Disconnect electrical connectors from valve and cap electrical connectors.
(2)Disconnect sense tube from valve and cap open tube ends.
(3)Remove the coupling that connects the HP valve to the tolerance take-up duct or two-piece tolerance take-up duct assembly.
(4)Disconnect the sense line from the tolerance take-up duct. Cut the safety wire and make the length of the tolerance take-up duct shorter. Use two spanner wrenches and turn the collars.
(5)Remove the coupling that connects the HP valve to the 14th-stage manifold. Remove the valve and seals.
(6)Cap valve and open ducts.
(7)Do a visual inspection of the seals for dents, scores and cracks. Replace unserviceable seals.
(8)Examine the couplings :
(a)Turn the coupling nuts with a torque wrench. If a nut turns with less than 6 lbf.in. (0.068 m.daN) torque, replace the nut or the coupling.
(b)Do a visual inspection of the couplings for scores, cracks, unusual wear and unusual bolt thread and nut conditions. Repair or replace unserviceable couplings.

R

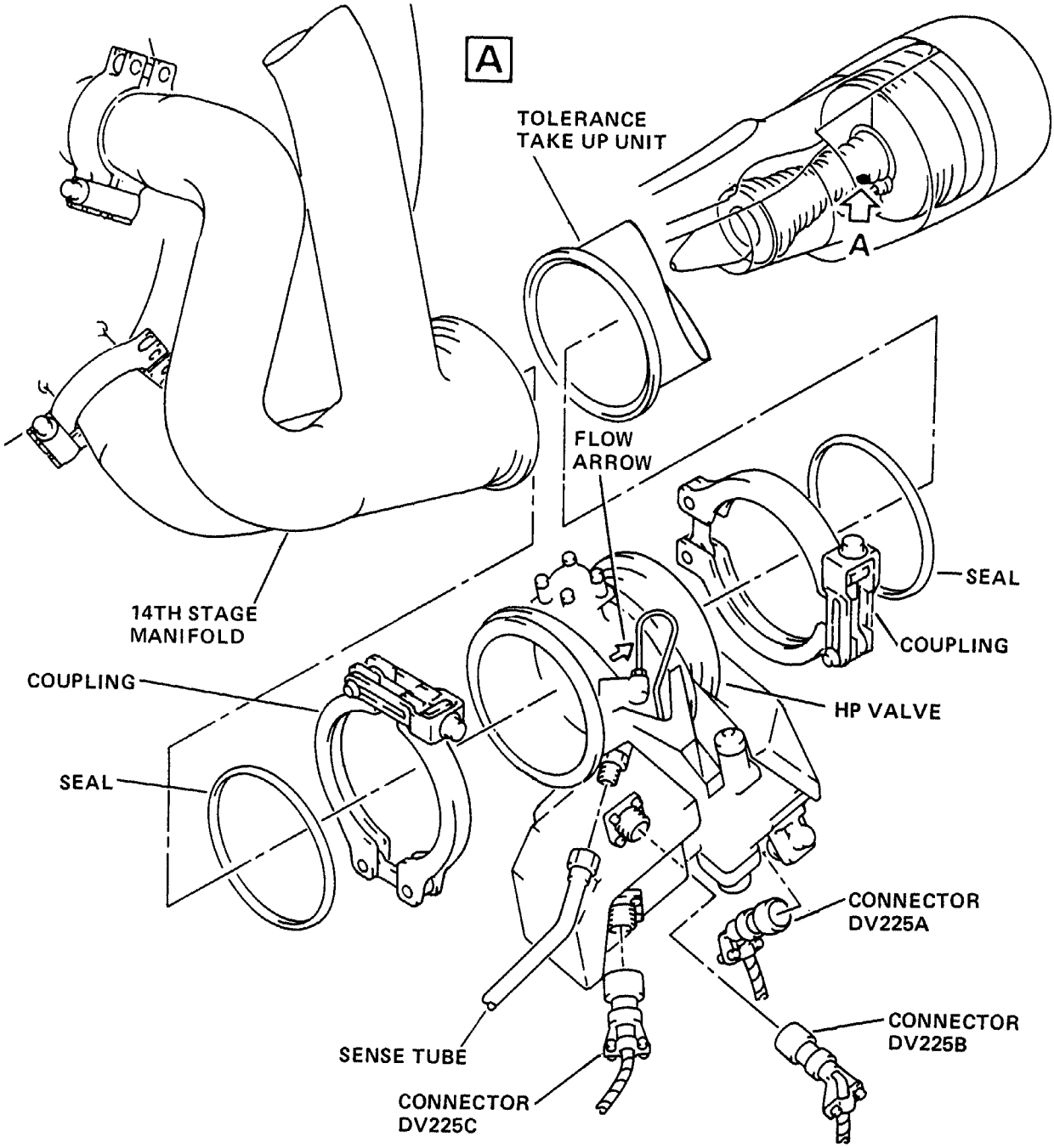
**ON A/C 004-100,

R C. Installation with Index Finger
(Ref. Fig. 401).



HP Valve with Index Finger (Sheet 1/2)
Figure 401

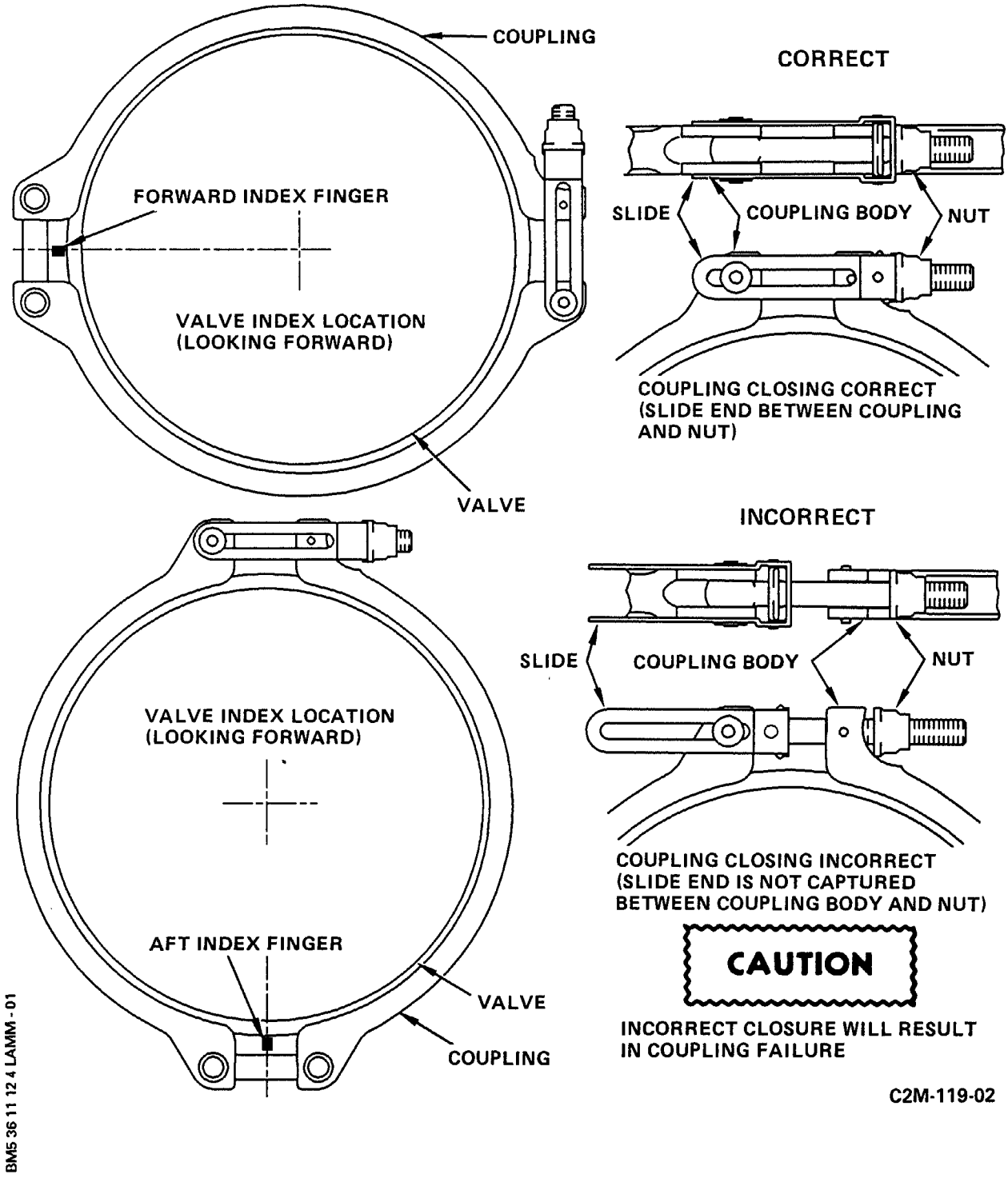
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BM5 36 11 12 4 LCMA - 00/30 - 00/25
DM5

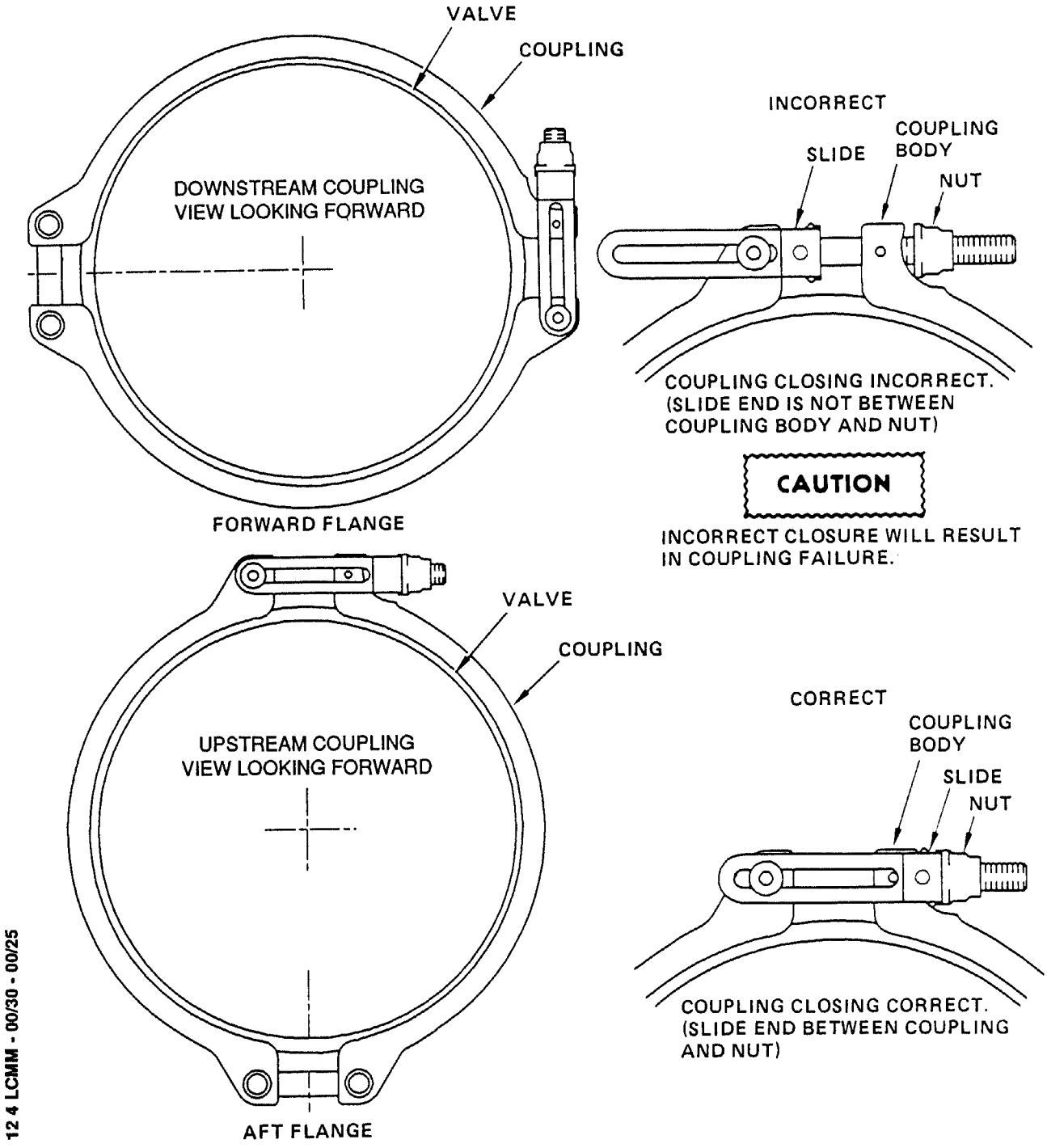
HP Valve without Index Finger (Sheet 1/2)
Figure 402

R



HP Valve with Index Finger (Sheet 2/2)
Figure 401

R



BM5 36 11 12 4 LCMM - 00/30 - 00/25
DM5

HP Valve without Index Finger (Sheet 2/2)
Figure 402

R

**ON A/C 001-003,

R C. Installation without Index Finger
(Ref. Fig. 402).

**ON A/C 001-100,

(1)Remove blanking caps from valve, ducts, electrical connectors and sense tube.
(2)Install valve and seals between 14th stage manifold and tolerance take-up unit, with flow arrow pointing away from manifold. Disregard alignment index arrows on valve and 14th stage manifold.

**ON A/C 004-100,

R (3)Connection of the valve with index finger.
CAUTION : INDEX FINGERS ON VALVE FLANGES ARE LOCATED AT 90° TO EACH OTHER. ALIGN COUPLING SO THAT NOTCH AT COUPLING HINGE IS OVER INDEX FINGER ON VALVE. (LOOKING FORWARD, AFT INDEX FINGER IS AT SIX O'CLOCK AND FORWARD FINGER IS AT 9 O'CLOCK.) (Ref. Fig. 401) SHEET 1. IF COUPLING LIP IS INSTALLED OVER INDEX FINGER, IT MAY CAUSE ITS FAILURE AND RELEASE SUPERHOT AIR IN NACELLE.

**ON A/C 001-003,

R (3)Connection of the valve without index finger.
CAUTION : POSITION COUPLING AT THE HPBV UPSTREAM FLANGE SO THAT COUPLING T-BOLT AND NUT ARE IN 12 O'CLOCK POSITION (LOOKING FORWARD) (Ref. Fig. 402).
CAUTION : POSITION COUPLING AT THE HPBV DOWNSTREAM FLANGE SO THAT COUPLING T-BOLT AND NUT ARE IN 3 O'CLOCK POSITION (LOOKING FORWARD) (Ref. Fig. 402).

**ON A/C 001-100,

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF THE COUPLING IS NOT CLOSED CORRECTLY, THE COUPLING WILL BE DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.
R (a)Connect the valve to the 14th-stage manifold with a coupling. Do not torque the coupling at this time.
(4)Connect sense tube and twist valve to eliminate any preload on the sense tube. Loosen sense line fitting connected to nipple installed on engine bracket if needed to eliminate preload on the sense tube. Do not torque sense tube fittings at this time.

(5)TORQUE valve couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Tap perimeters of couplings with nonmarring hammer. RETORQUE and tap again. RETORQUE and tap, then TORQUE to specified value.

NOTE : TORQUE junction couplings previously loosened to facilitate removal/installation operations, to between 115 and 125 lbf. in. (1.30 and 1.41 m.daN).

R CAUTION : WHEN THE TOLERANCE TAKE-UP DUCT IS ADJUSTED, DO NOT EXTEND
R MORE THAN THE STOPS. IF THE DUCT IS EXTENDED TOO FAR,
R THE DUCT WILL BE DAMAGED.
R THERE ARE TWO MANUFACTURERS OF THE TOLERANCE TAKE-UP UNIT
R (TTU).
R - THE ARROWHEAD TTU USES INTERNAL STOPS, DO NOT EXTEND THE
R DUCT TO THE POINT THAT THREADS ARE SEEN. THIS WILL DAMAGE
R THE DUCT.
R - THE EXOTIC METALS TTU USES EXTERNAL STOPS AND THREADS CAN
R BE SEEN. DO NOT EXTEND THE DUCT MORE THAN THE STOPS.
R THIS WILL DAMAGE THE DUCT.

(6)Extend the tolerance take-up duct or two-piece tolerance take-up duct assembly. Use two spanner wrenches and adjust the length until the duct aft flange and the valve flange touch all along the flange surfaces. Lightly hit the duct with a nonmarring hammer to get the ducts to align correctly. Make sure the sense line is aligned with the tolerance take-up duct.

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF THE COUPLING IS NOT CLOSED CORRECTLY, THE COUPLING WILL BE DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

(7)Connect the tolerance take-up duct to the valve with a seal and coupling. Connect the sense tube to the tolerance take-up duct. Do not torque the nut at this time.

(8)TORQUE the couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a nonmarring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.

(9)Remove the coupling that attaches the IP check valve to the intersect duct.

(10)Do an inspection of the clearance between the IP check valve and the intersect duct.

(a)A clearance of up to 0.035 in. (0.89 mm) is an indication that there is no preload and the assembly is serviceable. Safety the adjustment rings on the tolerance take-up duct with safetywire.

CAUTION : WHEN THE TOLERANCE TAKE-UP DUCT IS ADJUSTED, DO NOT EXTEND THE UNIT TO THE POINT THAT THREADS ARE SEEN. IF THE DUCT IS EXTENDED TOO FAR, THE DUCT WILL BE DAMAGED.

R THERE ARE TWO MANUFACTURERS OF THE TOLERANCE TAKE-UP UNIT
R (TTU).
R - THE ARROWHEAD TTU USES INTERNAL STOPS, DO NOT EXTEND THE
R DUCT TO THE POINT THAT THREADS ARE SEEN. THIS WILL DAMAGE

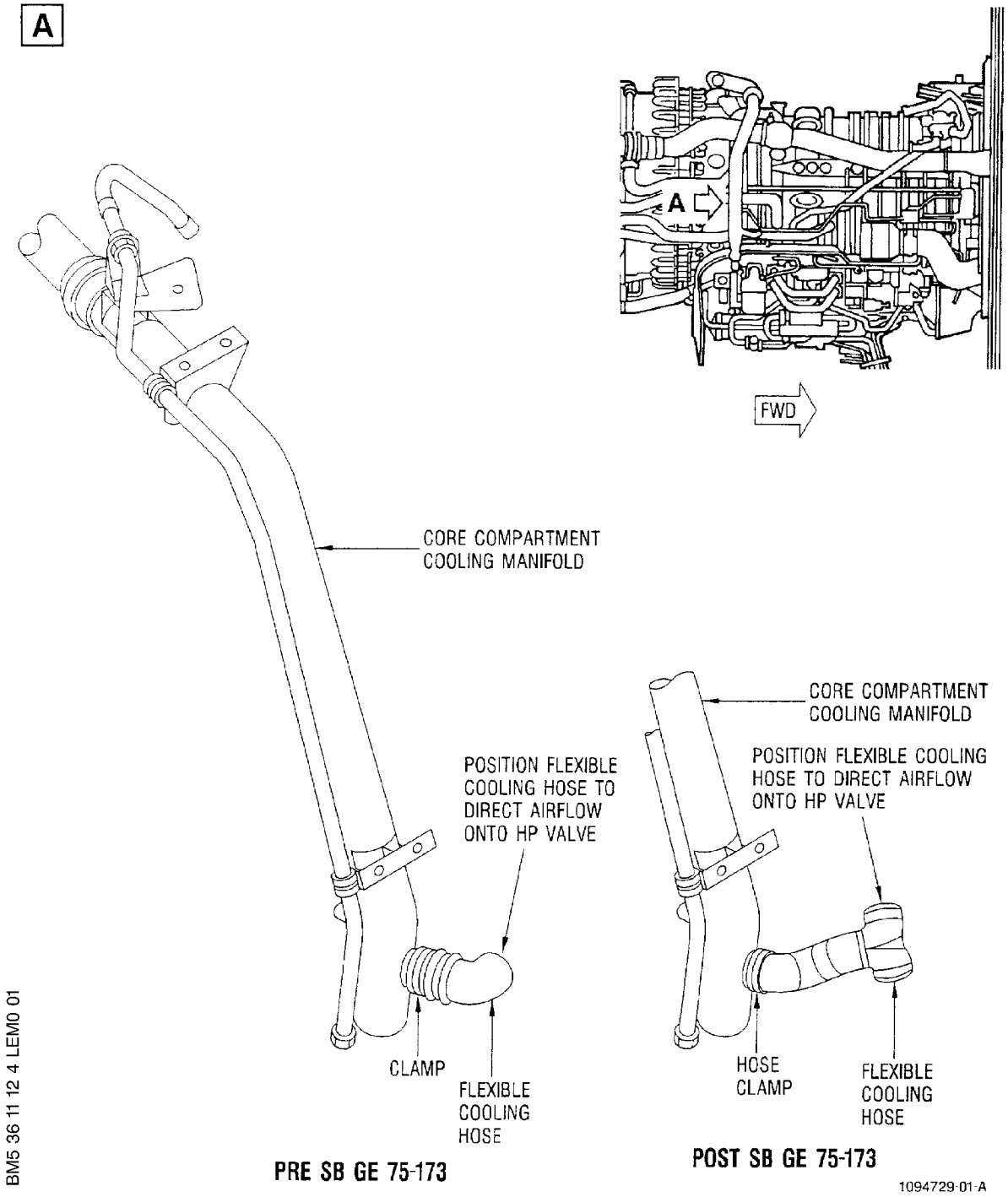
R THE DUCT.
R - THE EXOTIC METALS TTU USES EXTERNAL STOPS AND THREADS CAN
R BE SEEN. DO NOT EXTEND THE DUCT MORE THAN THE STOPS.
R THIS WILL DAMAGE THE DUCT.

(b)A clearance of more than 0.035 in. (0.89 mm) is an indication that there is preload and the assembly is unserviceable. Make the clearance smaller. Use two spanner wrenches and adjust the tolerance take-up duct.
Safety the adjustment rings on the tolerance take-up duct with safetywire.
CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT. IF THE COUPLING IS NOT CLOSED CORRECTLY, THE COUPLING WILL BE DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.

(11)Replace the coupling that attaches the IP check valve to the intersect duct.

(12)TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a nonmarring hammer and hit the coupling lightly. TORQUE and lightly hit the coupling two more times. TORQUE the coupling to the specified value.
(13)Ensure no preload exists on sense tube and TORQUE nut connected to valve to between 180 and 200 lbf. in. (2.03 and 2.26 m.daN). If the coupling at other end of sense line was loosened in step (4), TORQUE coupling to between 180 and 200 lbf. in. (2.03 and 2.26 m.daN).
(14)Connect electrical connectors DV225A, DV225B and DV225C to valve. Tighten connectors fingertight plus one-eighth turn.
(15)Check HPBV cooling hose. Adjust the flexible cooling hose as required to direct the airflow onto the HPBV.
(16)TORQUE the HPBV flexible cooling hose clamp to between 30 and 40 lbf.in. (0.34 and 0.45 m.daN).
(Ref. Fig. 403)

D. Leak Test (Ref. Fig. 404)
(1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No.C05-061) around the pneumatic joint or you can install aluminum foil around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
(a)Wind the foil wrap around the joint one time.
(b)Twist the seam of the foil wrap tight as shown.
(c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
(d)Attach the foil wrap with stainless steel lockwire (Material

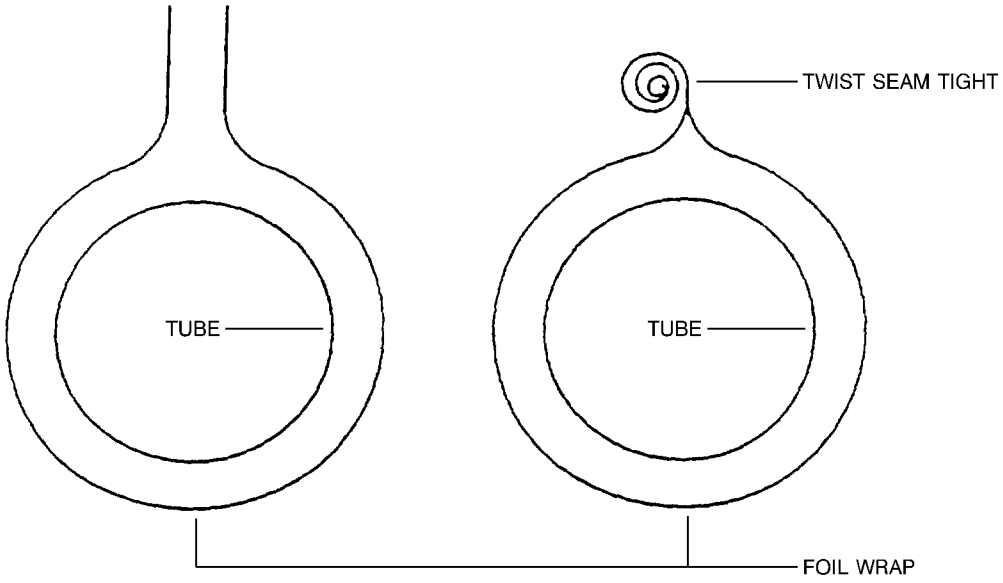


HPBV Cooling Hose Installation
Figure 403

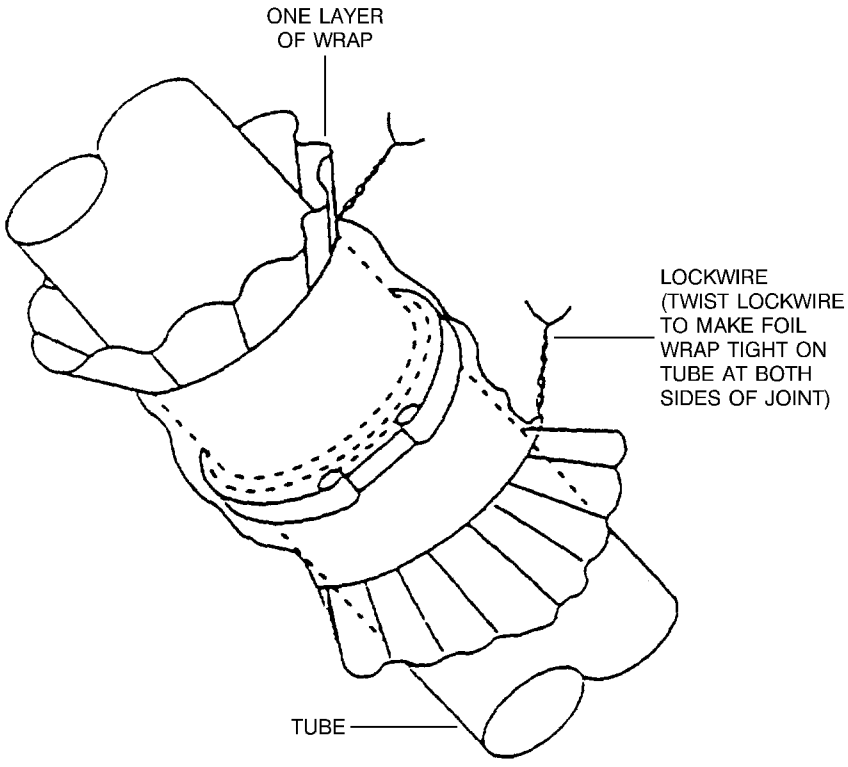
No.C10-071) at both sides of the pneumatic joint.
(2)Start the related engine (Ref. 71-00-00, P. Block 201) and keep it at idle for 5 minutes.
(3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 201).
(4)Make sure that there are no leaks at the junction between the HP valve and the duct on the related engine.

E. Test
(1)Perform BITE test (Ref. 36-11-00, P. Block 501, Operational Test).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 5HA, 7HA, 3HA, 8HA, 6HA, 10HA and 4HA.
(5)Remove warning notices.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 12 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 404

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m (8 ft)
B.	Torque Wrench - 115 - 200 lbf.in. (1.30 - 2.26 m.daN)
C.	Circuit Breakers Safety Clips
D.	Protective Covers
E.	Plastic Mallet
F.	Warning Notices
G. Material No.P06-009	Lubricants (Ref. 70-00-00)
H. Material No.P06-013	Lubricants (Ref. 70-00-00)
J. Material No.P05-034	Special Materials (Ref. 70-00-00)
K. Material No.P05-169	Special Materials (Ref. 70-00-00)
L. Material No.P05-289	Special Materials (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-00, P. Block 501	Engine Bleed Air Supply System
- 71-00-00, P. Block 201	Power Plant

R

3. Procedure

A. Job Set-Up
(1)On AIR BLEED section of panel 436VU :
(a)Make sure that X FEED valve position pushbutton switch is released (out).
(b)Make sure that APU BLEED switch is in OFF/R position.
(c)Put a warning notice to tell persons not to operate engine bleed air system.
(2)Put warning notice on HP ground connector access door 144BR to tell persons not to pressurize pneumatic system.
(3)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/ENG2/VALVES/HP	4HA	312/G53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/MONITOR	6HA	315/D54

(4)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(5)Install access platform.

B. Removal (Ref. Fig. 401)

R (1)Note location and disconnect electrical connectors DV255A, DV255B and
R DV255C from HP valve.
(2)Disconnect sensor tube from union (4) in valve (1).
(3)Remove couplings (2) and metal seals (3) from valve flanges. Retain seals for reinstallation
(4)Remove valve (1).
(5)Remove union (4) from valve.
(6)Install protective covers on electrical connectors, duct openings and sensor tube.

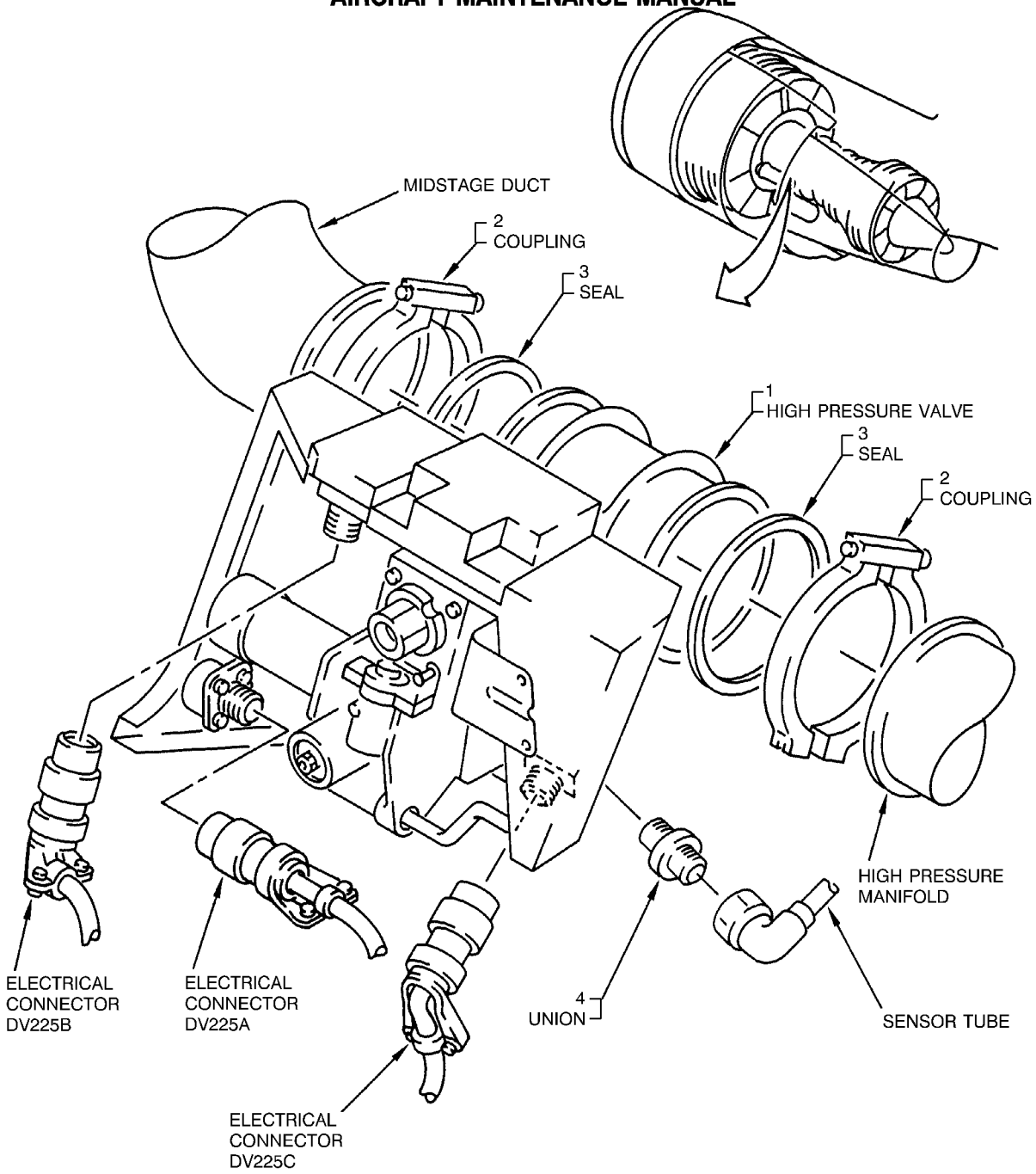
C. Installation (Ref. Fig. 401)
(1)Apply Material No. P06-009 to the threads of union (4) and install union in valve (1).TORQUE union (4) to between 115 and 130 lbf.in. (1.30 and 1.47 m.daN).
(2)Remove the protective covers from the ducts, electrical connectors, and sensor tube.
(3)Apply Material No. P06-009 to the screw threads of the couplings (2). Lubricate inner surfaces of couplings (2) with Material No.P06-013. Install couplings and metal seals (3) on valve (1) flanges.
(4)Install valve (1) between midstage duct and high pressure manifold with arrow pointing forward, 15 degrees inboard of centerline.
(5)Turn the valve (1) until the bracket on the bottom of the valve fits into the slot formed by the heat shield brackets on the end of the 15th stage manifold. (Ref. Fig. 402).
(6)Connect electrical connectors DV225A, DV225B, and DV225C to valve (1). Tighten the connectors finger tight. Tighten each connector an additional one-eighth turn.
(7)Be sure the threads of the union (4) are lubricated with Material P06-009. Connect the sensor tube to the union (4). TORQUE coupling nut on sensor tube to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).
(8)TORQUE the couplings (2) to between 115 lbf.in. and 125 lbf.in. (1.3 m.daN and 1.42 m.daN) or to the value specified on the coupling band. Tap on and around the top surface of the couplings with a plastic mallet while you tighten the coupling.

D. Leak Test (Ref. Fig. 403)
(1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No.P05-034) around the pneumatic joint or you can install aluminum foil (Material No.P05-169) around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
(a)Wind the foil wrap around the joint one time.
(b)Twist the seam of the foil wrap tight as shown.
(c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
(d)Attach the foil wrap with stainless steel lockwire (Material No.P05-289) at both sides of the pneumatic joint.
(2)Start the related engine (Ref. 71-00-00, P. Block 201) and keep it at idle for 5 minutes.

(3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 201).
(4)Make sure that there are no leaks at the junction between the HP valve and the duct on the related engine.

E. Test
(1)Perform BITE test (Ref. 36-11-00, P. Block 501, operational test).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close left thrust reverser doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 3HA, 5HA and 7HA (4HA, 6HA and 8HA).
(5)Remove warning notices.

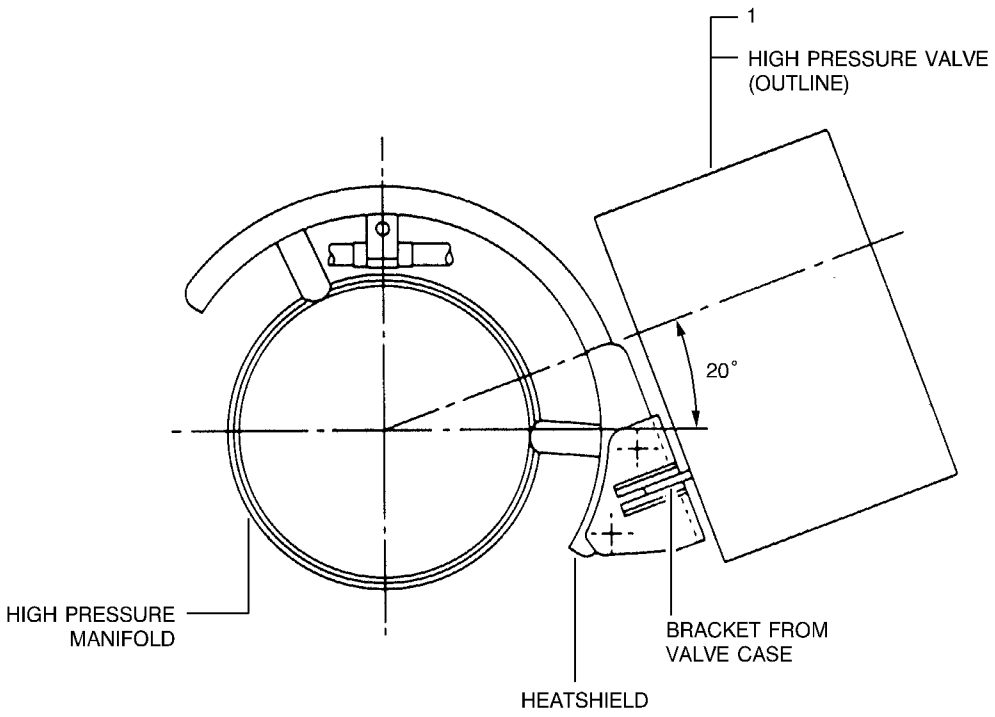


BM5 36 11 12 4 KAM0 01

L-A062R (0906)

HP Valve
Figure 401

R

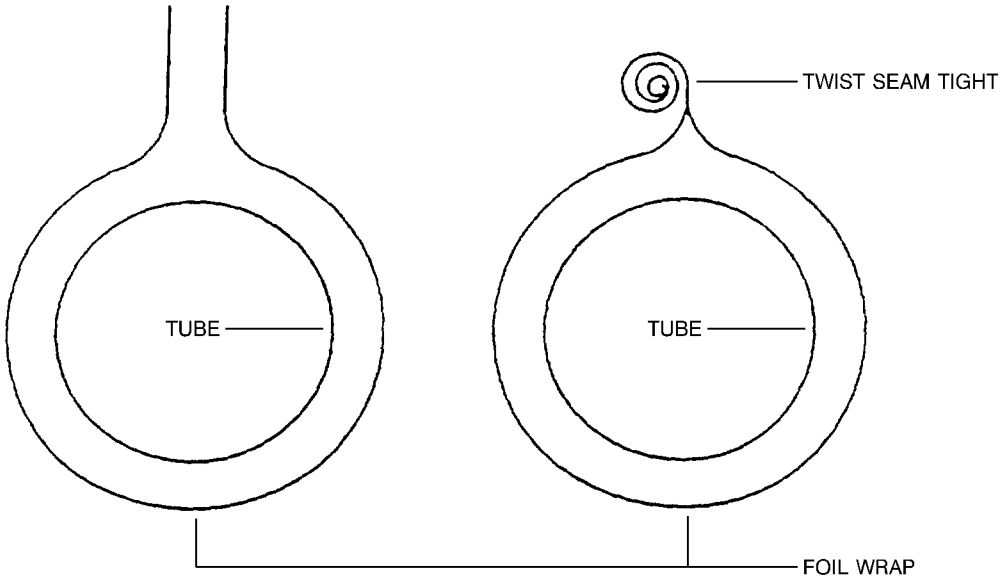


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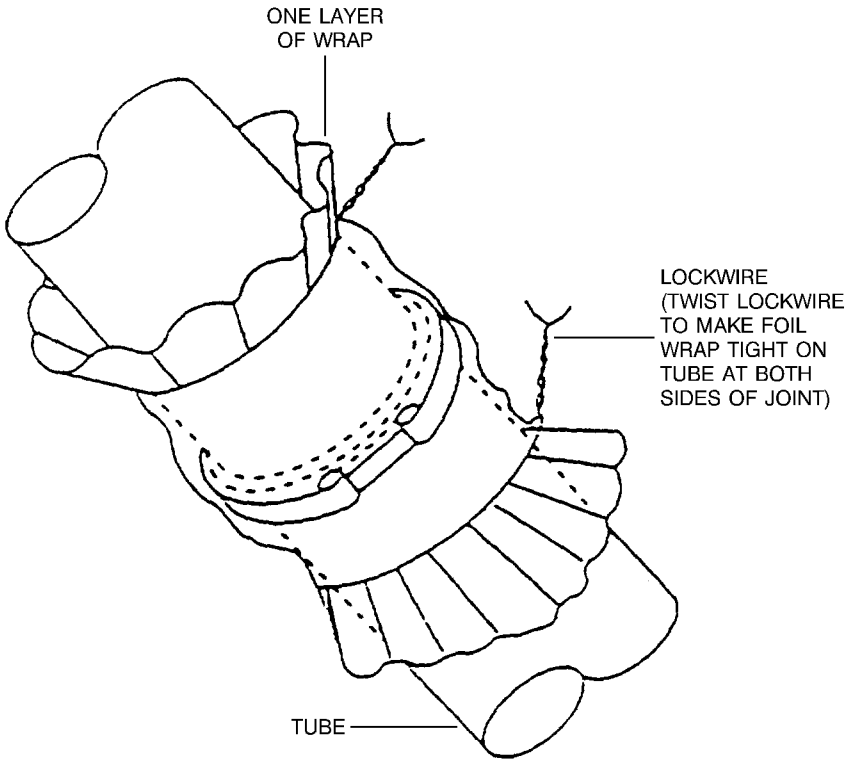
L-A243R (0507)

HP Valve - Orientation
Figure 402

R



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 12 4 ABM0 01

R Foil Wrap Installation at Pneumatic System Joints
Figure 403

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING OPERATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED:

1. Functional test

A. Equipment and Materials

	ITEM	DESIGNATION
	(1)290121-4	Test Set - Valve Actuating
	or	
	3792195-1	Test Set - Valve Actuating
	(2)	Access Platform 3.6 m (12 ft.)
	(3)	Lockwire Dia. 0.8 mm (0.031 in.)
	(4)	Gaskets (2)
R	(5)290435-1-1	R Adapter - Valve Test
R	(6)290169	T Adapter - Valve Test
	Referenced Procedures	
	- 24-41-00, P. Block 301	AC External Power Control
	- 71-13-00, P. Block 301	Cowl Doors

B. Procedure

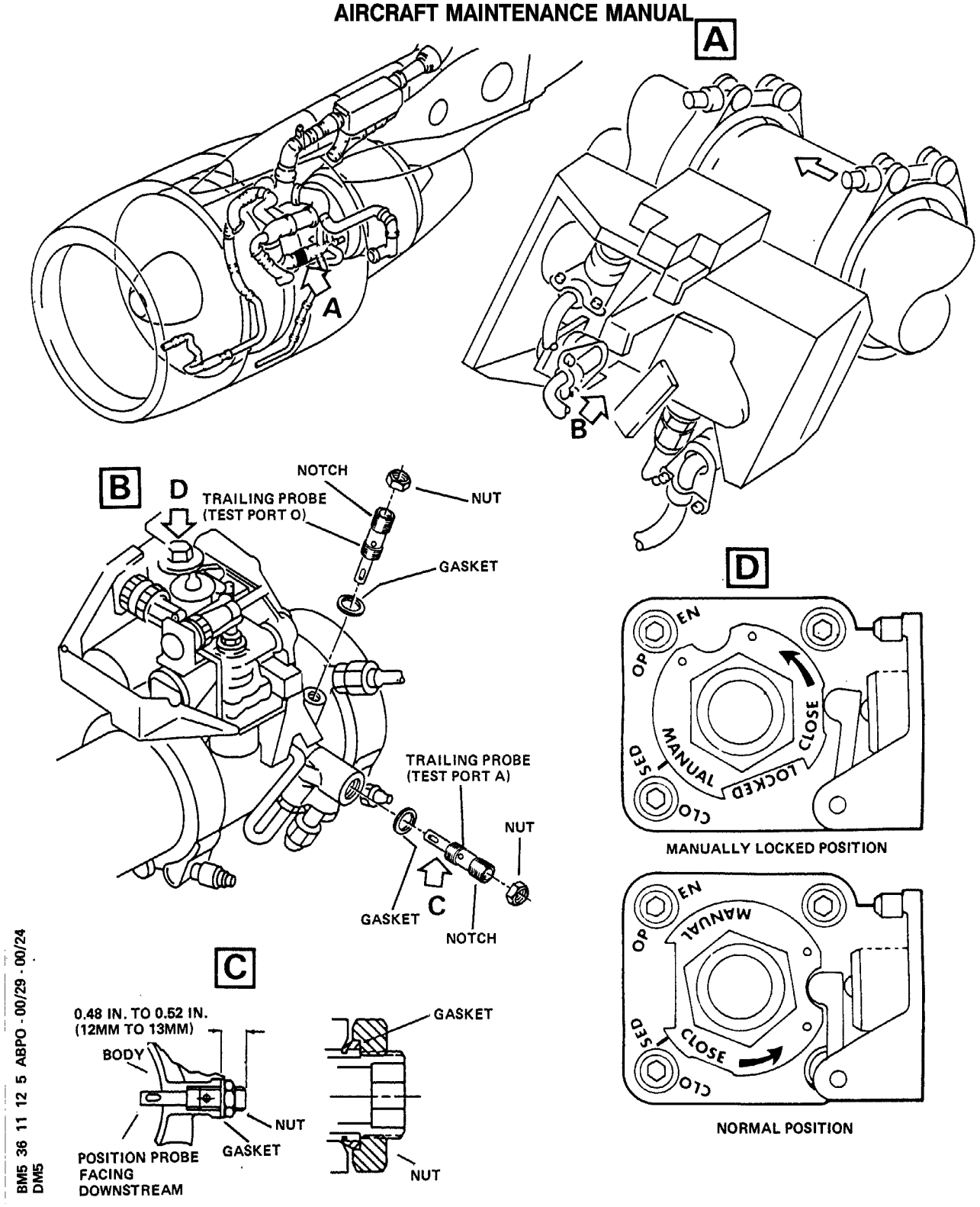
(Ref. Fig. 501)
(Ref. Fig. 502)

(1)Job set-up

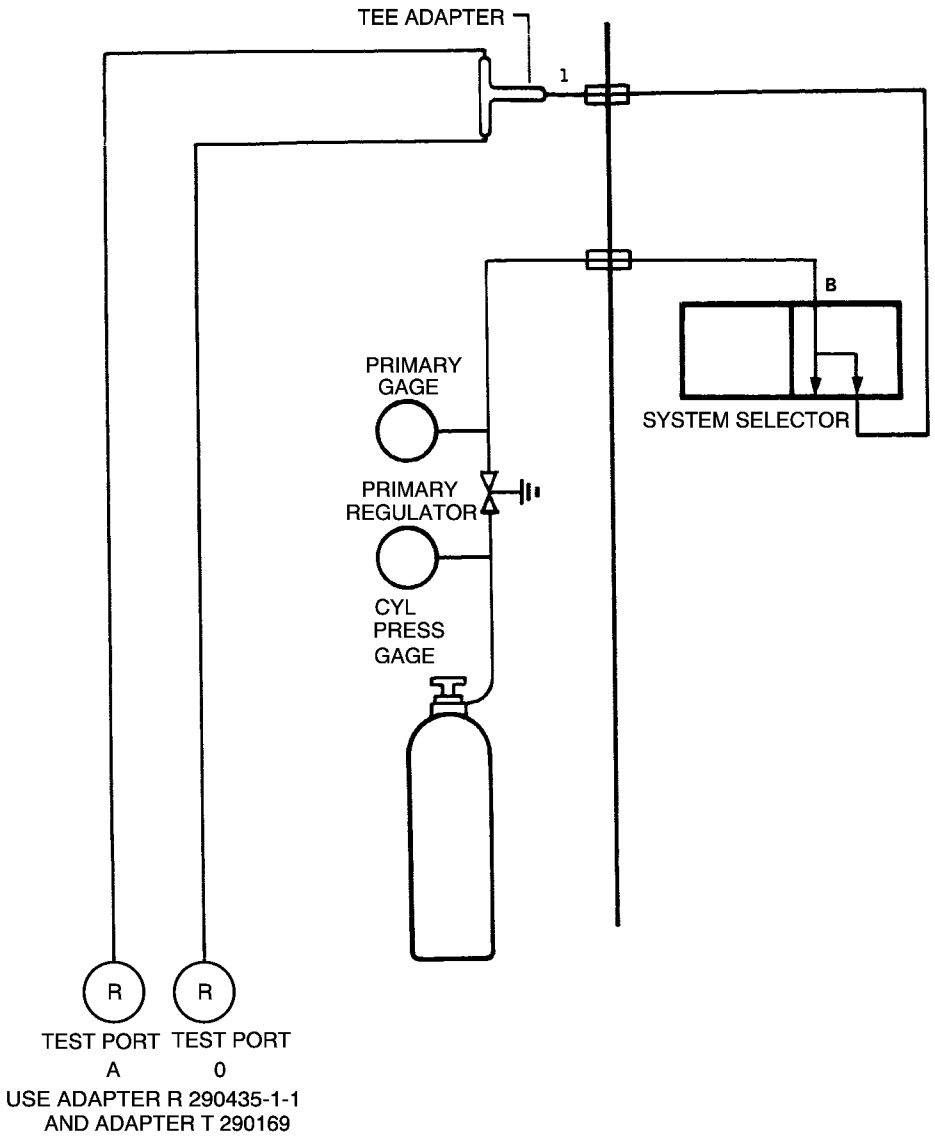
(a)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(c)On HP valve
- cut and remove lockwire, remove nuts and trailing probes from test ports A and O. Discard gaskets.
R - install adapters R 290435-1-1 on test ports A and O.
R NOTE : Adapters R are not supplied with the test set.
- make certain that valve manual override is not locked in closed position.

(d)Make certain that all test set controls are in OFF position.
R (e)Install adapter T 290169 on test set outlet union No.1 ; connect test
R hoses to adapter T 290169 and to adapters R 290435-1-1 of ports A and O.
(f)On ANTI ICE section of panel 426VU
- make certain that WING/SUPPLY and WING/MODE SEL pushbutton switches are released (out).

(g)On overhead panel
- make certain that ENG 1 (2) FIRE handle is pushed.



HP Valve Test Ports
Figure 501



NOTE: 28VDC ELECT POWER REQUIRED FOR TEST

BM5 36 11 12 5 ACM0 01

Test Set Connection Diagram
Figure 502

R

(h)Initial conditions
- correct electrical power supply
- forward services ventilation system in operation.
  Panel circuit breakers closed, particularly those associated with **AIR BLEED** and **AIR BLEED & COMPT TEMP.**

(i)On **AIR BLEED** section of panel **436VU**
CAUTION : MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.
- press **ENG 1 (ENG 2) HP VALVE** pushbutton switch (solenoid **A** of valve is energized).
- select **ENG 1 (ENG 2) BLEED VALVE** pushbutton switch **AUTO**
- select **X FEED** mode pushbutton switch **AUTO**

(2)Test

(a)Mechanical test

ACTION	RESULT
1. On test set - place **SYSTEM SELECTOR** in **B** position. - open cylinder shutoff valve - slowly increase pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while checking valve visual position indicator	- valve opens and is fully open when pressure reaches 10 psi (visual position indicator in **OPEN** position).
2. Slowly continue to increase pressure until reading on **PRIMARY GAGE** reaches 75 psi	- valve remains open.
3. On **AIR BLEED** section of panel **436VU** - release **ENG 1 (2) HP VALVE** pushbutton switch (**OFF**).	On **AIR BLEED** section of panel **436VU** - **OFF** legend on **HP VALVE** pushbutton switch comes on. Valve closes and visual position indicator moves to **CLOSED** position.
4. On **AIR BLEED** section of panel **436VU** - **PRESS ENG 1 (2) HP VALVE** pushbutton switch	- valve opens and visual position indicator moves to **OPEN** position.
5. On test set - continue to increase pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while checking valve visual position indicator	- valve closes and must be fully closed when pressure is **86 ± 4** psi (visual position indicator in **CLOSED** position).

(b)Wing anti-ice test

ACTION	RESULT
1. On **ANTI ICE** section of panel **426VU** - select **WING/SUPPLY** pushbutton switch **ON**	On **ANTI ICE** section of panel **426VU** - **ON** legend on **WING/SUPPLY** pushbutton switch comes on.

ACTION	RESULT
2. On **ANTI ICE** section of panel **471VU** - press and hold **WING/VALVES/TEST** pushbutton switch for more than 10 seconds - release **VALVES/TEST** pushbutton switch	- valve opens and visual position indicator moves to **OPEN** position. - after ten seconds valve closes and visual position indicator moves to **CLOSED** position.
3. On **ANTI ICE** section of panel **426VU** - release **WING/SUPPLY** pushbutton switch.	On **ANTI ICE** section of panel **426VU** - **ON** legend on **WING/SUPPLY** push-button switch goes off.
4. On test set - slowly shut down pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while checking valve visual position indicator	- valve opens at **86 ± 4** psi then closes when pressure drops below 10 psi ; visual position indicator moves to **OPEN** then to **CLOSED** posi-tion.

(3)Close-up
(a)On **AIR BLEED** section of panel **436VU**
- select **ENG 1 (ENG 2) BLEED VALVE** pushbutton switch **OFF**.
  . **OFF** legend on **ENG1 (ENG2) BLEED VALVE** pushbutton switch comes on.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)On test set
- close cylinder shutoff valve
- shut down pressure until **PRIMARY GAGE** reads zero
- place all controls in **OFF** position.

(d)Disconnect test set.
(e)On **HP** valve
- remove adapters **R** from test ports.
- install new gaskets on trailing probes and position trailing probes on test ports **A** and **O** with slot facing downstream as shown in detail **C**.
  CAUTION : SLOT IN PROBE MUST FACE DOWNSTREAM. RAPID CONTAMINATION WILL RESULT IF THE PROBES ARE NOT CORRECTLY INSTALLED.
- tighten and **TORQUE** nuts to between **360** and **420** lbf. in. (**4.07** and **4.75** m.da**N**). Wirelock nuts making certain that trailing probes remain correctly positioned.

(f)Make certain that working area is clean and clear of tools and miscel-laneous items of equipment.
(g)Remove access platform.
(h)Close engine cowls (Ref. 71-13-00, P. Block 301).
(j)Remove warning notices.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING OPERATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED:

1. Functional test

A. Equipment and Materials

ITEM	DESIGNATION
(1)290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
(2)	Access Platform 3.6 m (12 ft.)
(3)	Lockwire Dia. 0.8 mm (0.031 in.)
(4)	Gaskets (2)
(5)290435-1-1	Adapter - Valve Test
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-13-00, P. Block 301	Cowl Doors

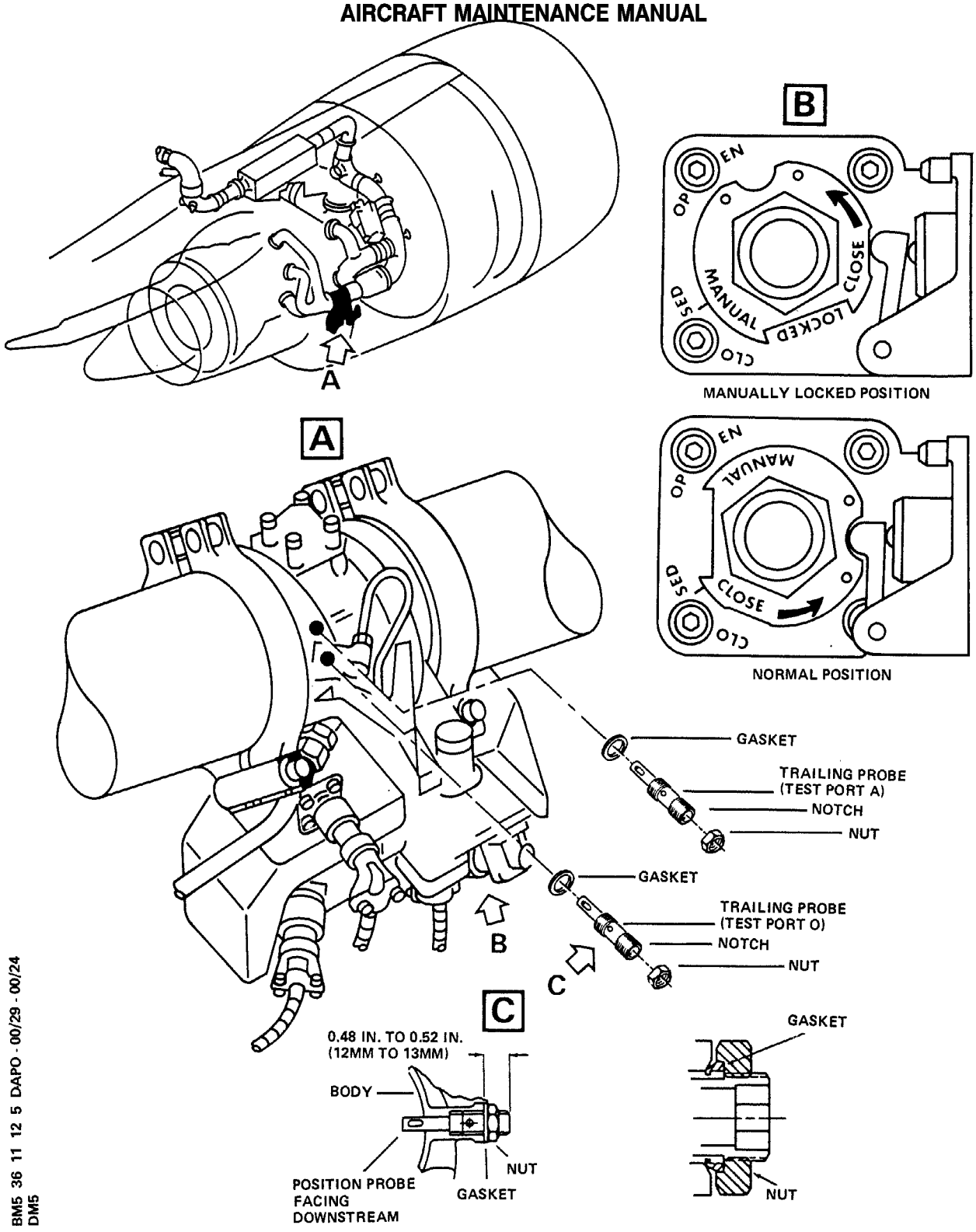
(Ref. Fig. 501)
(Ref. Fig. 502)

(1)Job set-up
(a)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(c)On HP valve
- cut and remove lockwire, remove nuts and trailing probes from test ports A and O. Discard gaskets.
- install adapters R of test set on test ports A and O.
- make certain that valve manual override is not locked in closed position.

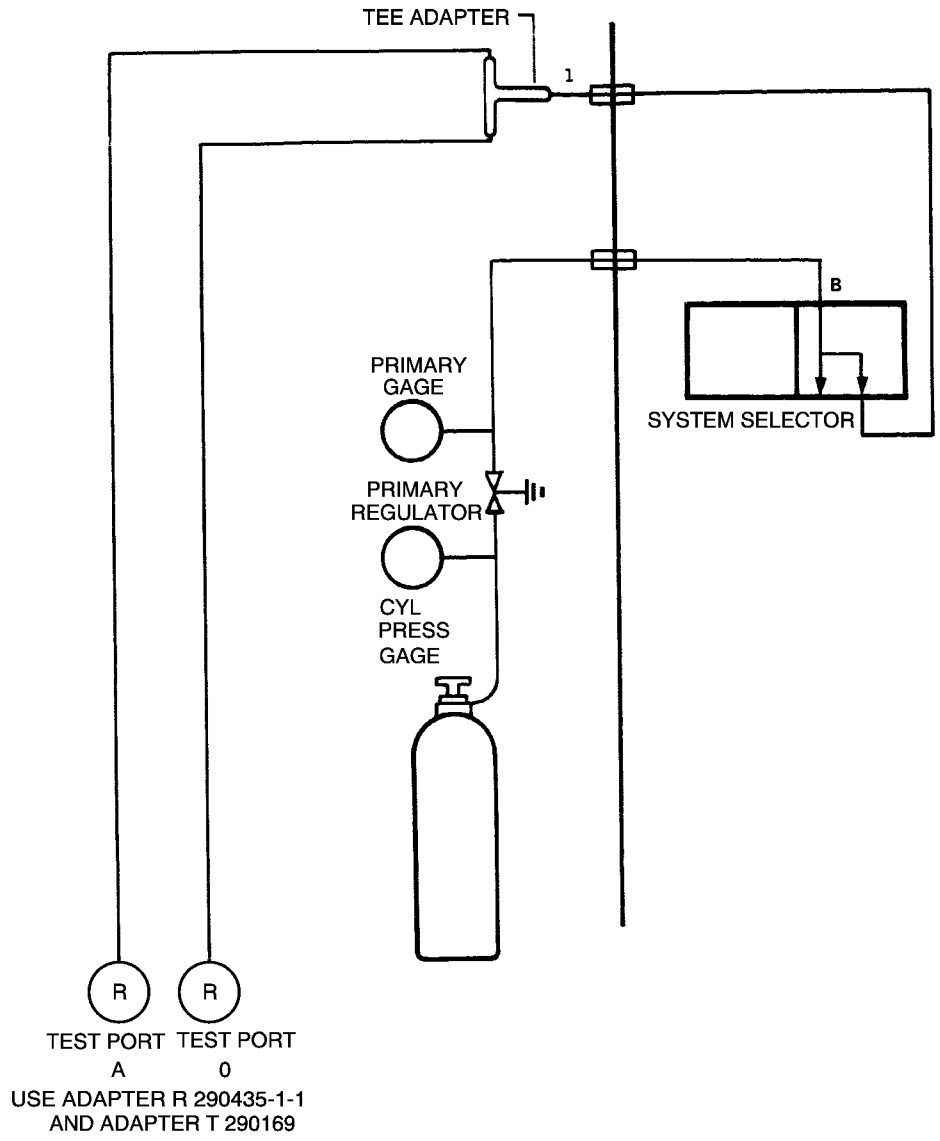
(d)Make certain that all test set controls are in OFF position.
(e)Install adapter T on test set outlet union No.1 ; connect test hoses to adapter T and to adapters R of ports A and O.
(f)On ANTI ICE section of panel 426VU
- make certain that WING/SUPPLY and WING/MODE SEL pushbutton switches are released (out).

(g)On overhead panel
- make certain that ENG 1 (2) FIRE handle is pushed.

(h)Initial conditions
- correct electrical power supply
- forward services ventilation system in operation.
Panel circuit breakers closed, particularly those associated with AIR BLEED and AIR BLEED & COMPT TEMP.



HP Valve Test Ports
Figure 501



NOTE: 28VDC ELECT POWER REQUIRED FOR TEST

BM5 36 11 12 5 ACM0 01

Test Set Connection Diagram
Figure 502

(i)On AIR BLEED section of panel 436VU
CAUTION : MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED DURING TEST.
- press ENG 1 (ENG 2) HP VALVE pushbutton switch (solenoid A of valve is energized).
- select ENG 1 (ENG 2) BLEED VALVE pushbutton switch AUTO
- select X FEED mode pushbutton switch AUTO

(2)Test
(a)Mechanical test

ACTION	RESULT
1. On test set - place SYSTEM SELECTOR in B position. - open cylinder shutoff valve - slowly increase pressure on PRIMARY GAGE by means of PRIMARY REGULATOR while checking valve visual position indicator	- valve opens and is fully open when pressure reaches 10 psi (visual position indicator in OPEN position).
2. Slowly continue to increase pressure until reading on PRIMARY GAGE reaches 75 psi	- valve remains open.
3. On AIR BLEED section of panel 436VU - release ENG 1 (2) HP VALVE pushbutton switch (OFF).	On AIR BLEED section of panel 436VU - OFF legend on HP VALVE pushbutton switch comes on. Valve closes and visual position indicator moves to CLOSED position.
4. On AIR BLEED section of panel 436VU - PRESS ENG 1 (2) HP VALVE pushbutton switch	- valve opens and visual position indicator moves to OPEN position.
5. On test set - continue to increase pressure on PRIMARY GAGE by means of PRIMARY REGULATOR while checking valve visual position indicator	- valve closes and must be fully closed when pressure is 86 ± 4 psi (visual position indicator in CLOSED position).

(b)Wing anti-ice test

ACTION	RESULT
1. On ANTI ICE section of panel 426VU - select WING/SUPPLY pushbutton switch ON	On ANTI ICE section of panel 426VU - ON legend on WING/SUPPLY pushbutton switch comes on.
2. On ANTI ICE section of panel 471VU - press and hold WING/VALVES/TEST pushbutton switch for more than 10 seconds	- valve opens and visual position indicator moves to OPEN position. - after ten seconds

ACTION	RESULT
- release **VALVES/TEST** pushbutton switch	valve closes and visual position indicator moves to **CLOSED** position.
3. On **ANTI ICE** section of panel **426VU** - release **WING/SUPPLY** pushbutton switch.	On **ANTI ICE** section of panel **426VU** - **ON** legend on **WING/SUPPLY** pushbutton switch goes off.
4. On test set - slowly shut down pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while checking valve visual position indicator	- valve opens at **86 ± 4** psi then closes when pressure drops below 10 psi ; visual position indicator moves to **OPEN** then to **CLOSED** position.

(3)Close-up
(a)On **AIR BLEED** section of panel **436VU**
- select **ENG 1 (ENG 2) BLEED VALVE** pushbutton switch **OFF**.
  . **OFF** legend on **ENG1 (ENG2) BLEED VALVE** pushbutton switch comes on.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)On test set
- close cylinder shutoff valve
- shut down pressure until **PRIMARY GAGE** reads zero
- place all controls in **OFF** position.

(d)Disconnect test set.
(e)On **HP** valve
- remove adapters **R** from test ports.
- install new gaskets on trailing probes and position trailing probes on test ports **A** and **O** with slot facing downstream as shown in detail **C**.
  CAUTION : SLOT IN PROBE MUST FACE DOWNSTREAM. RAPID CONTAMINATION WILL RESULT IF THE PROBES ARE NOT CORRECTLY INSTALLED.
- tighten and **TORQUE** nuts to between **360** and **420** lbf. in. (**4.07** and **4.75** m.da**N**). Wirelock nuts making certain that trailing probes remain correctly positioned.

(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Remove access platform.
(h)Close engine cowls (Ref. 71-13-00, P. Block 301).
(j)Remove warning notices.

HP VALVE - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Items 2 and 3 (IP check valves and HP valves)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Deactivation

A. Reason for the Job
To permit dispatch of the aircraft with one check valve or one HP valve inoperative, provided that this HP valve is secured in closed position and associated HP valve pushbutton switch selected OFF.

B. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 3.6 m (12 ft.)
2.	Circuit Breaker Safety Clips
3.	Warning Notices

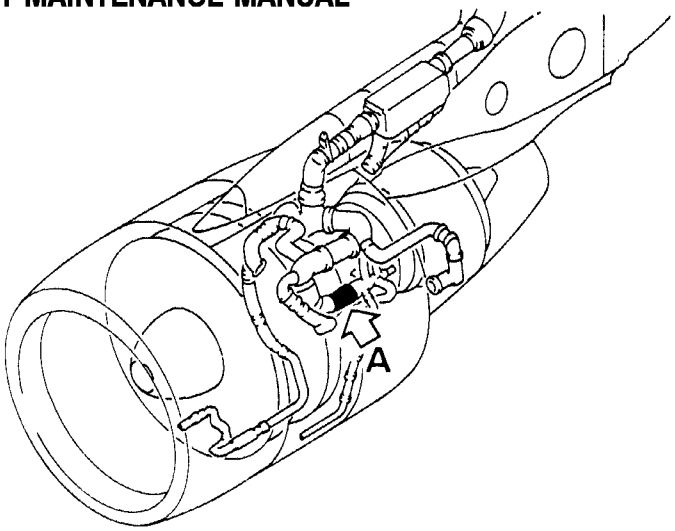
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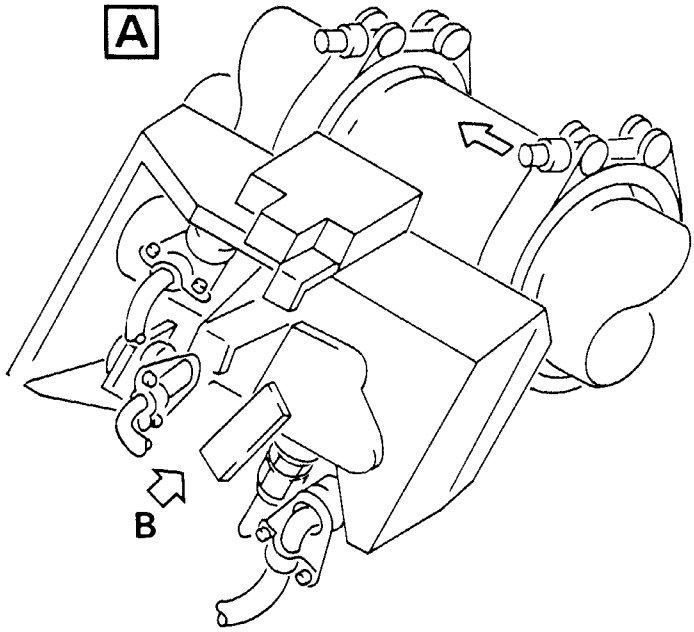
Referenced Procedure
- 71-13-00, P. Block 301 Cowl Doors

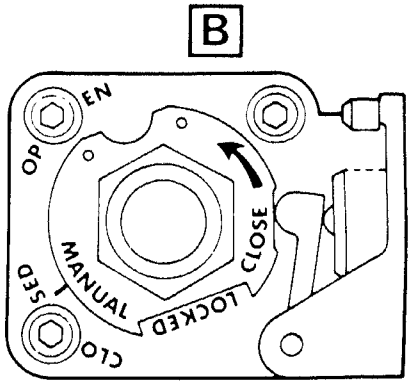
C. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/REV/CTL	1KM	332/U69
133VU	ENG2/REV/CTL	2KM	331/V74
133VU	ENG1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG1 & 2/START CTL & WARN	1KG	335/R68

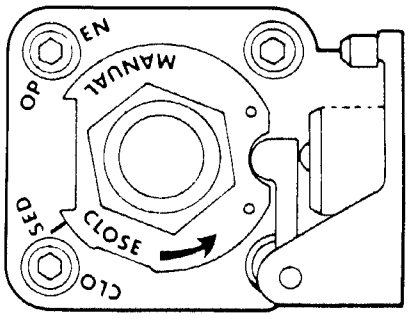
(b)Position access platform.
(c)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Deactivation
(a)On AIR BLEED section of panel 436VU, select ENG 1 (ENG 2) HP VALVE pushbutton switch OFF.
R (b)Manually place HP valve in CLOSED position.
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscel-







MANUALLY LOCKED POSITION



NORMAL POSITION

BM5 36 11 12 9 AAMO-19-07
DM5

HP VALVE
Figure 901

laneous items of equipment.
(b)Remove warning notices.
(c)Close engine cowls (Ref. 71-13-00, P.Block 301).
(d)Remove access platform.
(e)Remove safety clips and tags and close circuit breakers.
(f)Install a temporary placard in the flight compartment to warn the flight crew that engine 1 (engine 2) HP valve is deactivated.
(g)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 3.6 m (12 ft.)
R (2)	Corrosion Resistant Steel Lockwire Dia.
R	0.8 mm (0.032 in.)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68

(b)Position access platform.
(c)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Reactivation
(a)Turn manual override (clockwise) to normal configuration and secure manual override with lockwire.
(b)Trouble shoot the system (Ref. TSM, chapter 36-11).
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove temporary placard.
(c)Clear technical log.
(d)Close engine cowls (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.
(f)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM, 2KM.

HP VALVE - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Items 2 and 3 (IP check valves and HP valves)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Deactivation

A. Reason for the Job

To permit dispatch of the aircraft with one check valve or one HP valve inoperative, provided that this HP valve is secured in closed position and associated HP valve pushbutton switch selected OFF.

B. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 3.6 m (12 ft.)
2.	Circuit Breaker Safety Clips
3.	Warning Notices

Referenced Procedure

- 71-13-00, P. Block 301	Cowl Doors

C. Procedure

(Ref. Fig. 901)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG1/REV/CTL	1KM	332/U69
133VU	ENG2/REV/CTL	2KM	331/V74
133VU	ENG1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG1 & 2/START CTL & WARN	1KG	335/R68

(b)Position access platform.

(c)Open right thrust reverser door (Ref. 71-13-00, P. BlocK 301).

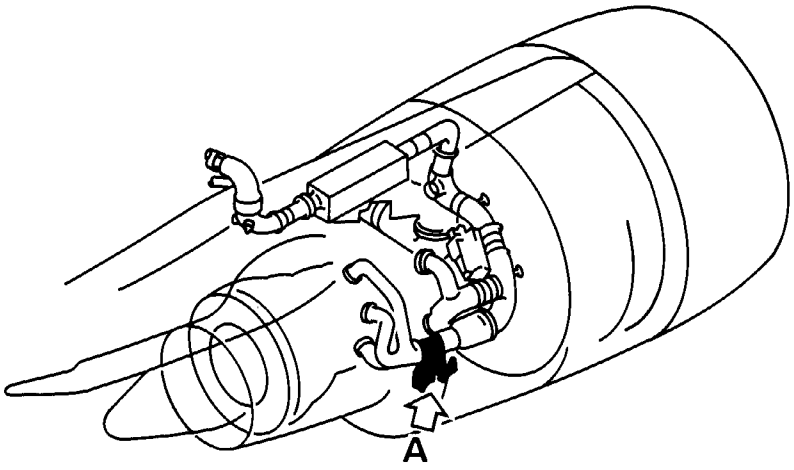
(2)Deactivation

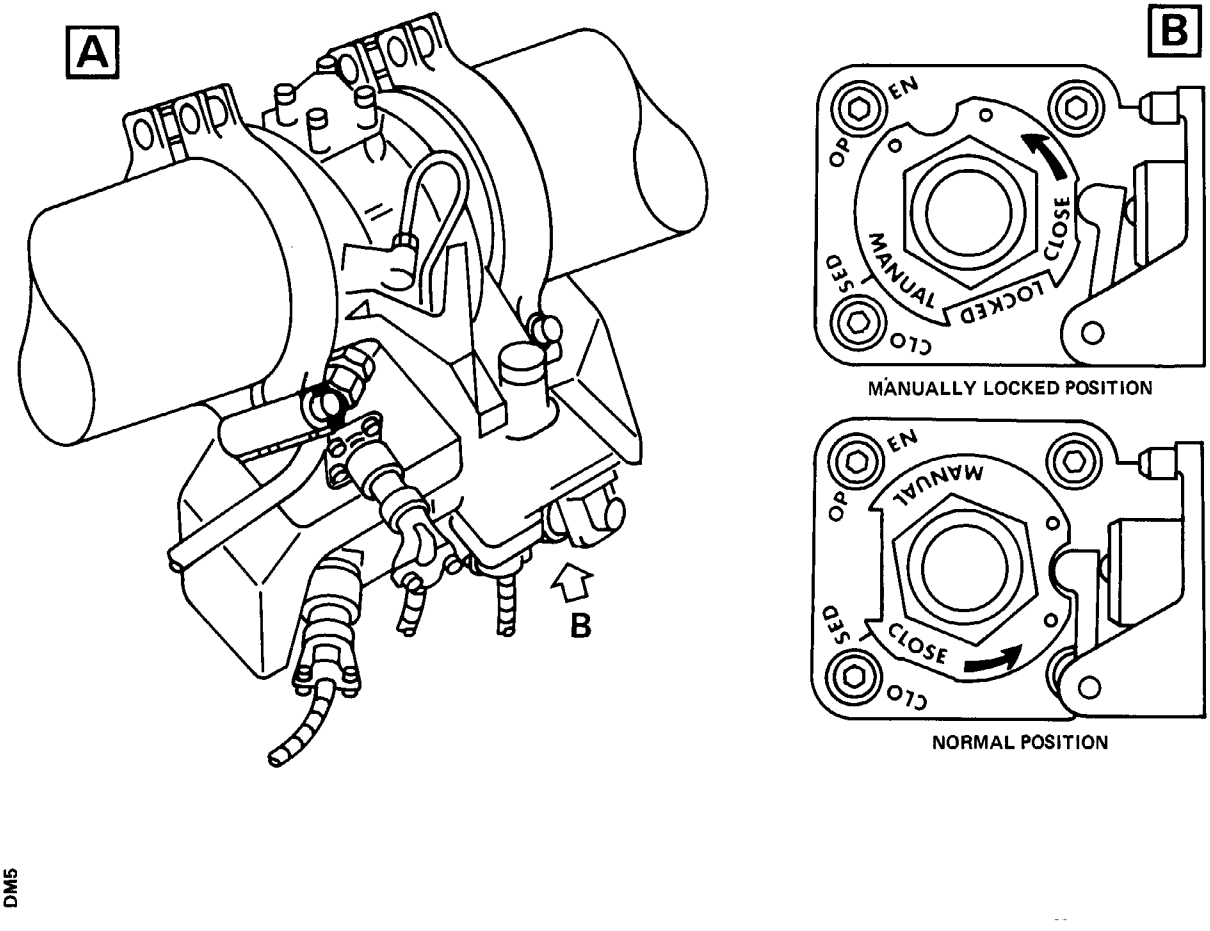
(a)On AIR BLEED section of panel 436VU, select ENG 1 (ENG 2) HP VALVE pushbutton switch OFF.

(b)Manually place HP valve in CLOSED position.

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscel-





BM5 36 11 12 9 DAMO - 13 - 07
DM5

HP VALVE
Figure 901

laneous items of equipment.
(b)Remove warning notices.
(c)Close engine cowls (Ref. 71-13-00, P.Block 301).
(d)Remove access platform.
(e)Remove safety clips and tags and close circuit breakers.
(f)Install a temporary placard in the flight compartment to warn the flight crew that engine 1 (engine 2) HP valve is deactivated.
(g)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 3.6 m (12 ft.)
(2)	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68

(b)Position access platform.
(c)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Reactivation
(a)Turn manual override (clockwise) to normal configuration and secure manual override with lockwire.
(b)Trouble shoot the system (Ref. TSM, chapter 36-11).
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove temporary placard.
(c)Clear technical log.
(d)Close engine cowls (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.
(f)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM, 2KM.

IP CHECK VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF APPROPRIATE ENGINE
. PRESSURIZATION OF PNEUMATIC SYSTEM.

NOTE : To facilitate removal/installation operations, it is recommended to loosen all junction couplings between ducts and between valves and ducts.

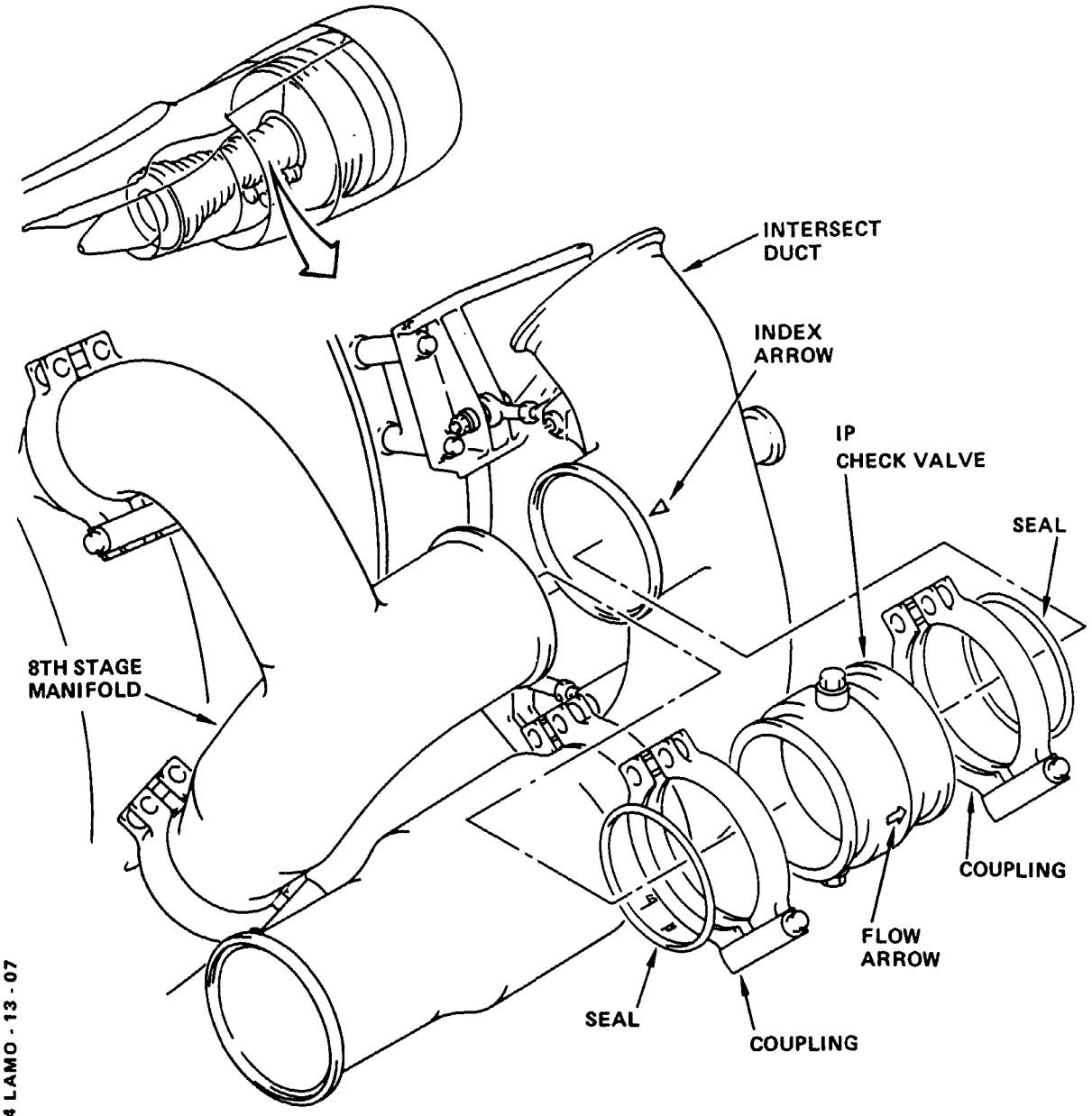
1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Blanking Plugs/Caps
C.	Aluminum Foil
D.	Torque Wrench - 50 - 125 lbf.in. (0.56 - 1.41 m.daN)
E.	Warning Notices
F.	Spanner Set
G. Material No.C05-061	Special Materials (Ref. 70-00-00)
H. Material No.C10-071	Special Materials (Ref. 70-00-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors
- 78-31-05, P. Block 401	Pressure Regulating and Shut-Off Valve
- 71-00-00, P. Block 501	Power Plant

2. Procedure

A. Job Set-Up
(1)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Position access platform.

B. Removal
(Ref. Fig. 401)
(1)Remove the coupling and seal that connects the T/R valve air tube to the intersect duct.
(2)Loosen the coupling that connects the T/R valve air tube to the ground (Y) check valve. Turn the T/R valve air tube away from the intersect duct.
(3)Remove the couplings and seals that connect the intersect duct to the pressure regulator valve, the tolerance take-up duct, and the IP check valve. Remove the bolt, nut, and washer that connects the upper link to the intersect duct if necessary to get clearance.
(4)Move the intersect duct forward and down to permit the LP check valve to be removed.
(5)Remove the coupling and seal that attaches the IP check valve to the 8th-stage manifold.
(6)Remove the IP check valve.



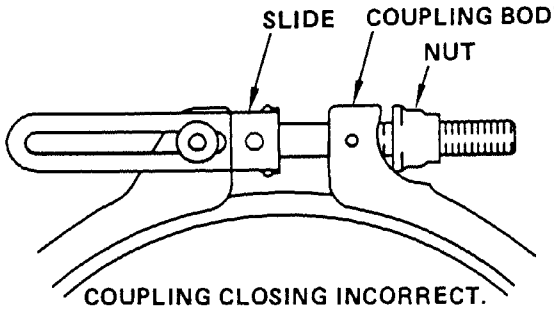
IP Check Valve
Figure 401

(7)Put a cap for protection on the ducts and pressure regulator valve.
(8)Do a visual inspection of the seals for dents, scores and cracks. Replace unserviceable seals.
(9)Examine the couplings :
(a)Turn the coupling nuts with a torque wrench. If a nut turns with less than 6 lbf.in. (0.068 m.daN) torque, replace the nut or the coupling.
(b)Do a visual inspection of the couplings for scores, cracks, unusual wear and unusual bolt thread and nut conditions. Repair or replace unserviceable couplings.

C. Installation (Ref. Fig. 401)
(1)Remove blanking caps from valve, 8th stage manifold and intersect duct.
CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 402). IF THE COUPLING IS NOT CLOSED CORRECTLY, THE COUPLING WILL BE DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COUPLING BODY AND THE NUT.
NOTE : Do an inspection of all duct pilots for damage before they are installed.
(2)Connect the IP check valve to the 8th-stage manifold with a coupling and seal. Make sure the flow arrow on the valve points forward and the valve shaft is vertical. TORQUE the coupling to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a nonmarring hammer and hit the couplings lightly. TORQUE and lightly hit the couplings two more times. TORQUE the couplings to the specified value.
(3)Connect the intersect duct to the IP check valve, the pressure regulating valve and the tolerance take-up duct. Use couplings and seals. Do not torque the couplings at this time.
(4)Turn the T/R valve air tube toward the intersect duct. Connect the T/R valve air tube to the intersect duct with a coupling and seal. Tighten the couplings on the T/R valve air tubes (Ref. 78-31-05, P. Block 401).
NOTE : It is very important that the T/R air tube couplings be tightened correctly.
(5)If necessary, connect the upper link to the intersect duct with a bolt, washer, and nut. TORQUE the nut to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN).
(6)TORQUE all the intersect duct couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a nonmarring hammer and hit the couplings lightly. TORQUE and lightly hit the couplings two more times. TORQUE the couplings to the specified value.

D. Leak Test (Ref. Fig. 403)
(1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No.C05-061) around the pneumatic joint or you can install aluminum foil around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
(a)Wind the foil wrap around the joint one time.

INCORRECT

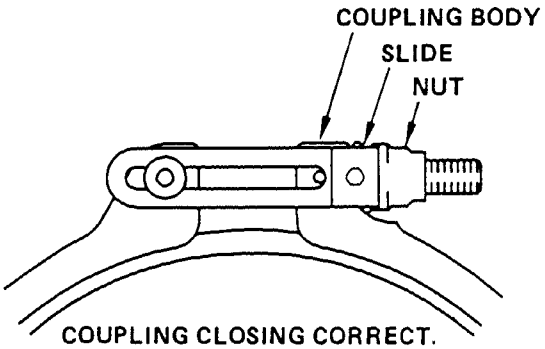


COUPLING CLOSING INCORRECT.
(SLIDE END IS NOT BETWEEN
COUPLING BODY AND NUT)

CAUTION

INCORRECT CLOSURE WILL RESULT
IN COUPLING FAILURE.

CORRECT



COUPLING CLOSING CORRECT.
(SLIDE END BETWEEN COUPLING
AND NUT)

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DM5

C2M–121–00

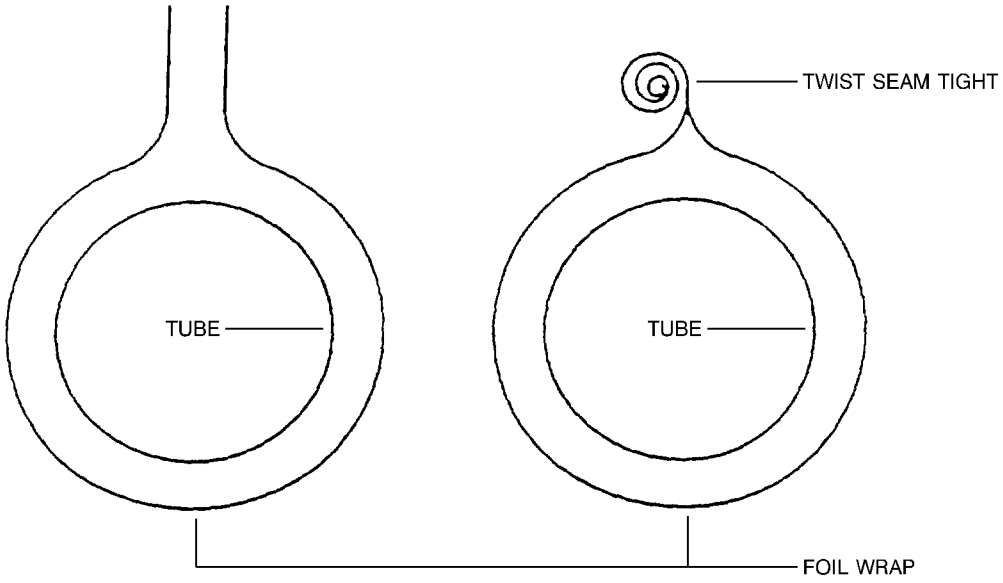
Duct Coupling Installation Caution
Figure 402

(b)Twist the seam of the foil wrap tight as shown.
(c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
(d)Attach the foil wrap with stainless steel lockwire (Material No.C10-071) at both sides of the pneumatic joint.

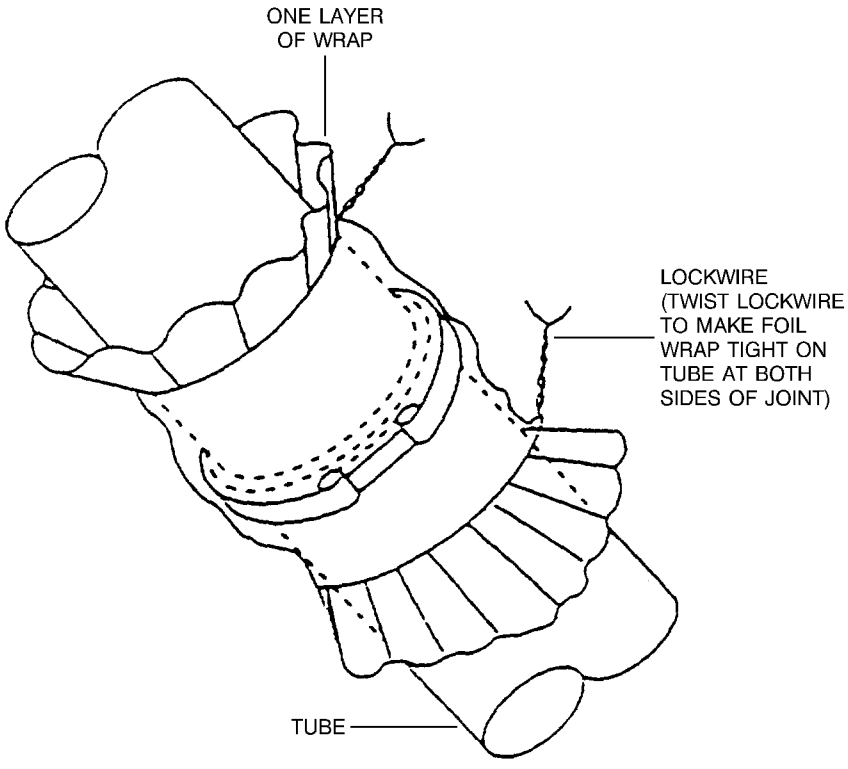
(2)Start the related engine (Ref. 71-00-00, P. Block 501) and keep it at idle for 5 minutes.
(3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 501).
(4)Make sure that there are no leaks at the junction between the IP check valve and the duct on the related engine.

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove warning notices.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 13 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 403

IP CHECK VALVE - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m (8 ft)
B. Material No.P06-013	Lubricants (Ref. 70-00-00)
C.	Protective Covers
R D. Material No.P05-034	Special Materials (Ref. 70-00-00)
R E. Material No.P05-169	Special Materials (Ref. 70-00-00)
R F. Material No.P05-289	Special Materials (Ref. 70-00-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors
R - 71-00-00, P. Block 201	Power Plant

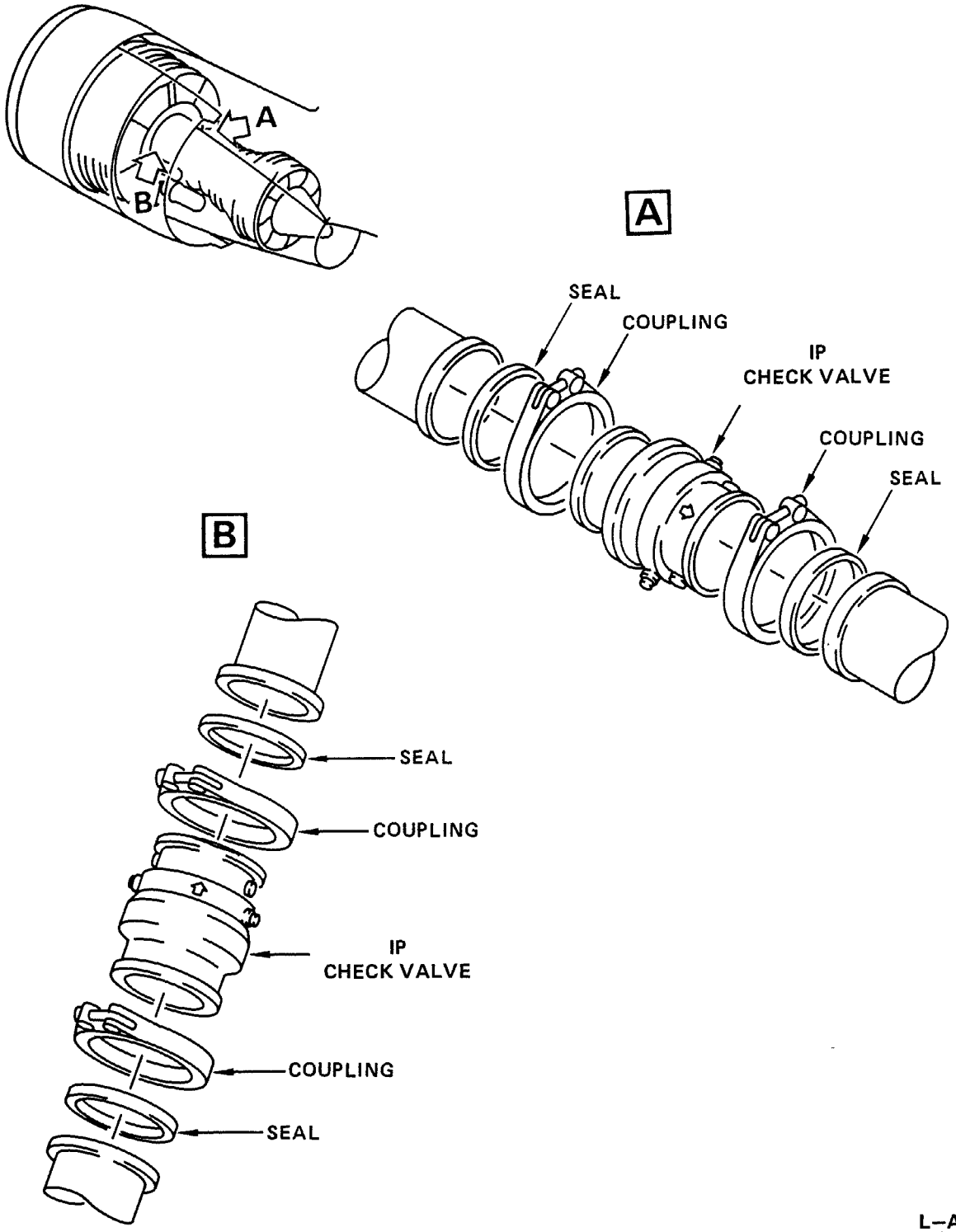
2. Procedure

A. Job Set-Up
(1)Open thrust reverser doors (Ref. 71-13-00, P. Block 301).
(2)Install access platform.

B. Removal
R (Ref. Fig. 401)
R (Ref. Fig. 403)
NOTE : Removal/Installation procedures are identical for both check valves.
(1)Remove couplings and metal seals attaching valve to ducting and remove valve.
(2)Install protective covers on open ducting.

C. Installation
R (1)Installation of the IP check valve (pre SB PW4 NAC 36-15).
R (Ref. Fig. 401)
R (a)Lubricate inside surfaces of couplings with Material No.P06-013.
R (b)Remove protective covers from ducting.
R (c)Install couplings and metal seals on valve flanges, and align valve, arrow on valve indicates direction of airflow away from engine.
R (d)Install couplings on valve and ducting. TORQUE couplings to value indicated on band.
R (2)Installation of the IP check valve (post SB PW4 NAC 36-15).
R (Ref. Fig. 403).
R (a)Lubricate inside surfaces of couplings with Material No.P06-013.
R (b)Remove protective covers from ducting.
R (c)Install couplings and metal seals on valve flanges, and align valve, arrow on valve indicates direction of airflow away from engine.
R (d)Install couplings on valve and ducting and rotate to within 10 degrees of the valve port centerline. TORQUE couplings to value indicated on band.

R D. Leak Test (Ref. Fig. 402)
R (1)There are two possible procedures to find the location of a pneumatic



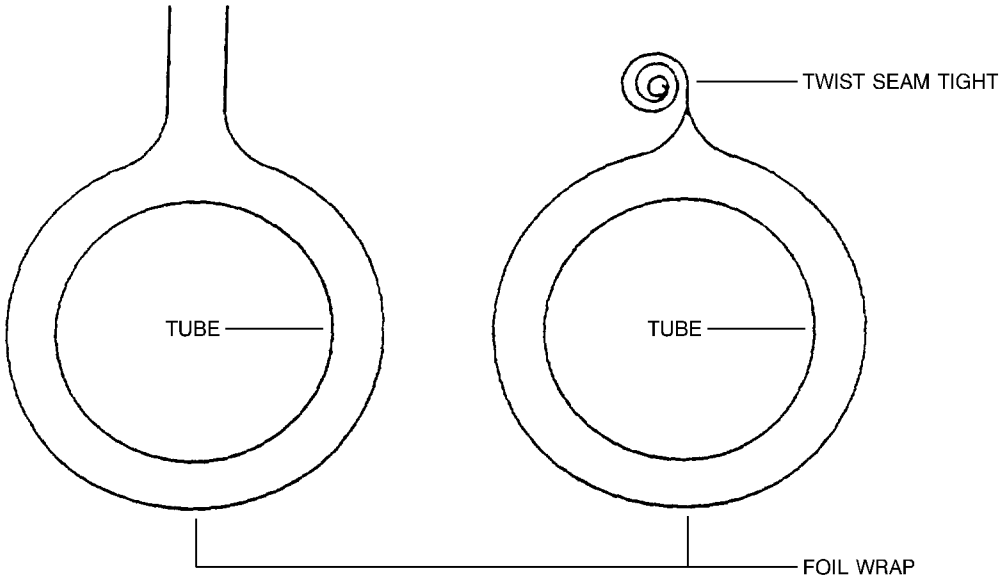
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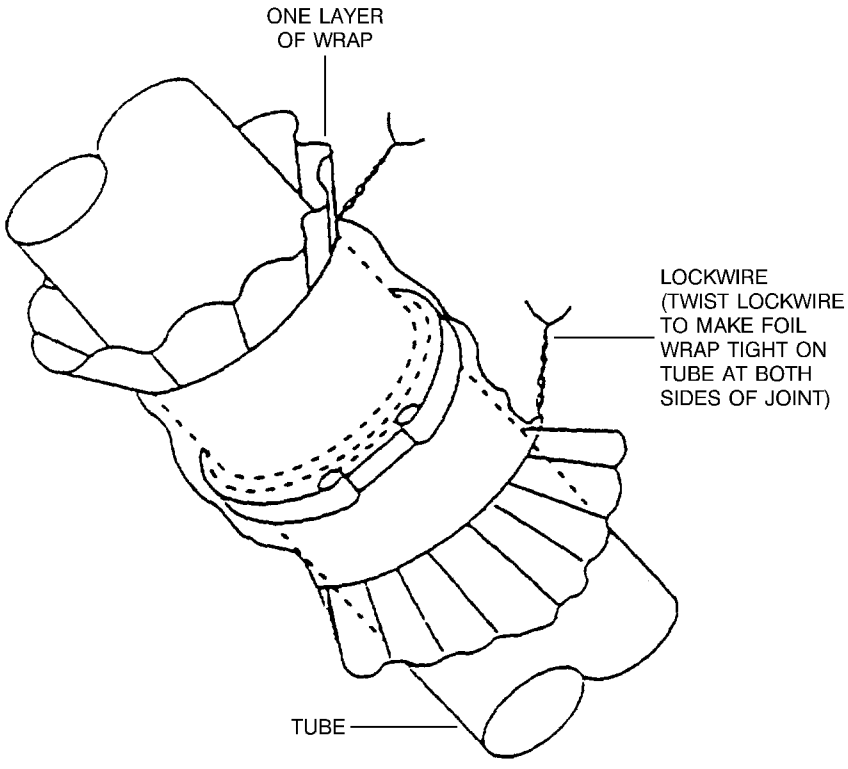
IP Check Valve
(pre SB PW4 NAC 36-15)
Figure 401

R joint air leak. You can apply dry developer (Material No.P05-034) around the pneumatic joint or you can install aluminum foil (Material No.P05-169) around the pneumatic joint locations.
R Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
R (a)Wind the foil wrap around the joint one time.
R (b)Twist the seam of the foil wrap tight as shown.
R (c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
R (d)Attach the foil wrap with stainless steel lockwire (Material No.P05-289) at both sides of the pneumatic joint.
R (2)Start the related engine (Ref. 71-00-00, P. Block 201) and keep it at idle for 5 minutes.
R (3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 201).
R (4)Make sure that there are no leaks at the junction between the IP check valve and the duct on the related engine.

R E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser doors (Ref. 71-13-00, P. Block 301).



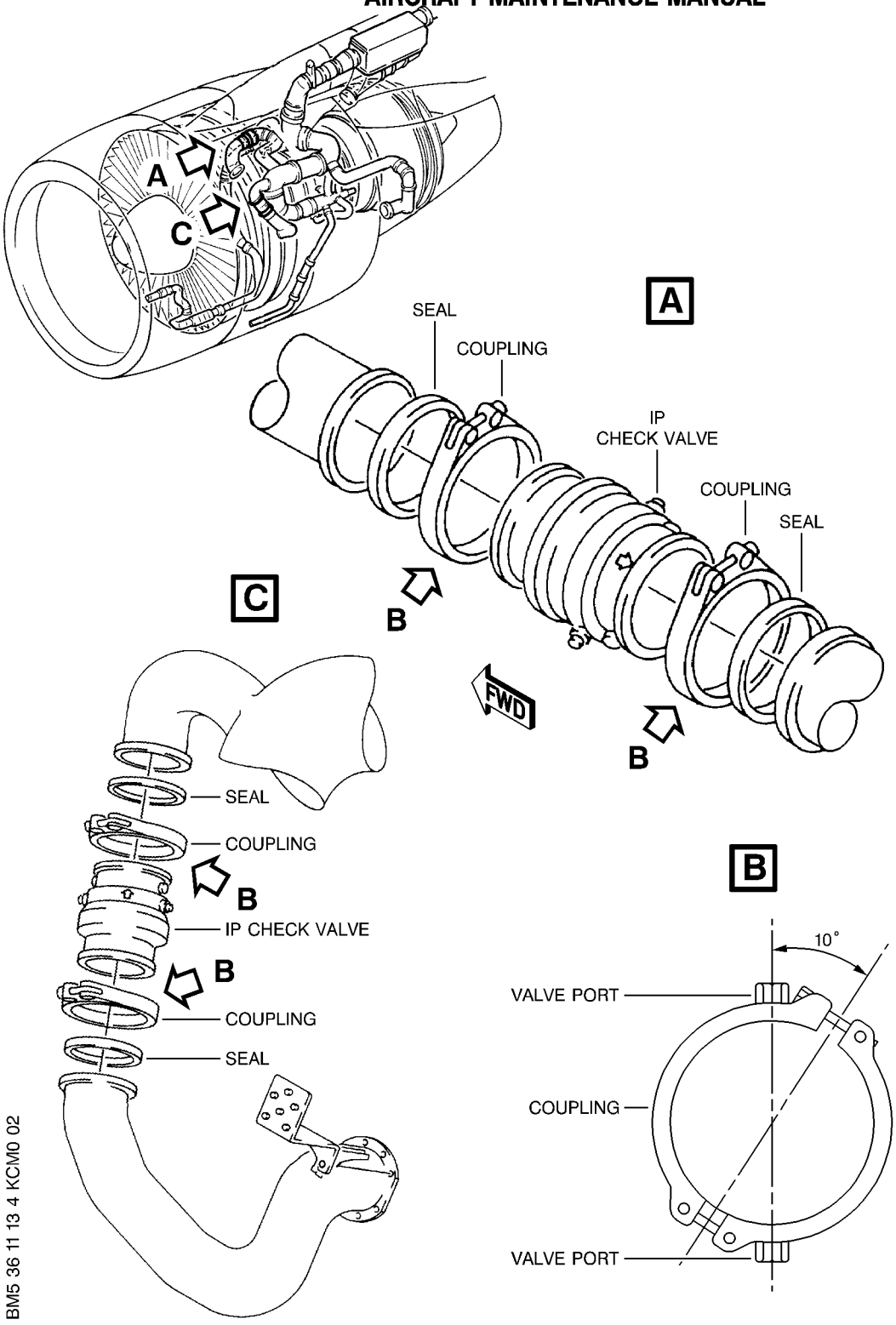
TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 13 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 402

R



IP Check Valve
(post SB PW4 NAC 36-15)
Figure 403

R

BLEED VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF APPROPRIATE ENGINE
. PRESSURIZATION OF PNEUMATIC SYSTEM.

NOTE : For information related to inspection/check of hoses, tubes and ducts (Ref. 36-11-00, P. Block 601).

NOTE : To facilitate removal/installation operations, it is recommanded to loosen all junction couplings between ducts and between valves and ducts.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Torque Wrench - 50 - 300 lbf.in. (0.56 - 3.39 m.daN)
C.	Circuit Breaker Safety Clips
D.	Blanking Plugs/Caps
E.	Warning Notices
F.	Aluminum Foil
G. RSE1202	Spanner Set
H. Material No.C05-061	Special Materials (Ref. 70-00-00)
J. Material No.C10-071	Special Materials (Ref. 70-00-00)
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-00, P. Block 501	Engine Bleed Air Supply System
- 36-11-00, P. Block 601	Engine Bleed Air Supply System
- 78-31-05, P. Block 401	Pressure Regulating and Shut-Off Valve
- 71-00-00, P. Block	Power Plant

2. Procedure

A. Job Set-Up
(1)On AIR BLEED section of panel 436VU :
(a)Make sure that X FEED valve position pushbutton switch is released (out).
(b)Make sure that APU BLEED switch is in OFF/R position.
(c)Put a warning notice to tell persons not to operate engine bleed air system.
(2)Put warning notice on HP ground connector access door 144BR to tell persons not to pressurize pneumatic system.
(3)Open, safety and tag the following circuit breakers for the appropriate engine :

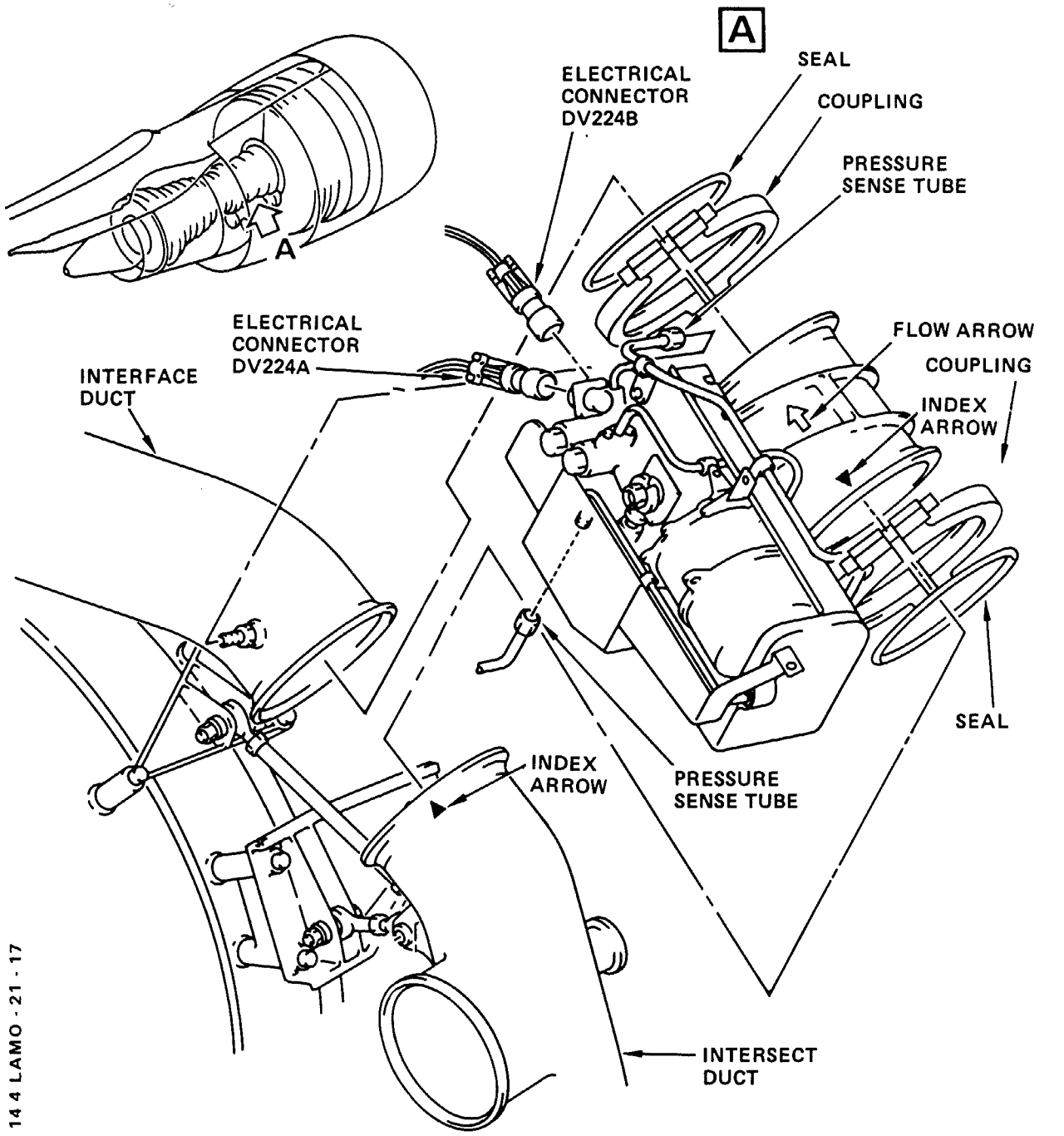
PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED & COMPT TEMP/ENG1 CONTROLLER/ MONITOR	5HA	209/A17
22VU	AIR BLEED & COMPT TEMP/ENG1 CONTROLLER/	7HA	209/A18

PANEL	SERVICE	IDENT.	LOCATION
	CTL		
131VU	AIR BLEED & COMPT TEMP/VALVES/ENG1 VALVES/BLEED	11HA	311/H54
131VU	AIR BLEED & COMPT TEMP/ENG2/VALVES/ BLEED	12HA	311/H55
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/ CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER	6HA	315/D54

(4)Open right thrust reverser doors (Ref. 71-13-00, P. Block 301).
(5)Position access platform.

B. Removal (Ref. Fig. 401)
(1)Disconnect electrical connectors DV224A and DV224B from valve and cap electrical connectors.
(2)Disconnect pressure sense tubes from valve and interface duct and cap open duct ends.
(3)Remove the coupling and seal that connects the 8th-stage low pressure check valve to the intersect duct.
(4)Remove the coupling and seal that connects the tolerance take-up duct to the intersect duct.
(5)Disconnect the sense line and clamps at the pneumatic pressure regulating valve.
(6)If necessary for clearance, remove the bolts, nuts, and washers that attach the three links to the intersect duct.
(7)Remove the couplings and seals that connect the thrust reverser (T/R) valve air tubes to the intersect duct and the interface duct.
(8)Loosen the couplings that connect the T/R valve air tubes to the ground (Y)-check valve. Turn the T/R valve air tubes away from the intersect and interface ducts for clearance.
(9)Remove the couplings and seals that attach the pneumatic pressure regulating valve to the intersect and interface ducts.
(10)Move the intersect duct away from the pneumatic pressure regulating valve for clearance.
(11)Remove the pneumatic pressure regulating valve and seals.
(12)Put a cap for protection on the ducts and valve.
(13)Cap valve and open duct ends.
(14)Do a visual inspection of the seals for dents, scores and cracks. Replace unserviceable seals.
(15)Examine the couplings :
(a)Turn the coupling nuts with a torque wrench. If a nut turns with less than 6 lbf.in. (0.068 m.daN) torque, replace the nut or the coupling.
(b)Do a visual inspection of the couplings for scores, cracks, unusual wear and unusual bolt thread and nut conditions. Repair or replace unserviceable couplings.

C. Installation (Ref. Fig. 401)
(1)Remove blanking caps from valve and ducts.



Bleed Valve
Figure 401

CAUTION : MAKE SURE THE SLIDE-END OF THE COUPLING IS INSTALLED BETWEEN THE COUPLING BODY AND THE NUT (Ref. Fig. 402). IF THE COUPLING IS NOT CLOSED CORRECTLY, THE COUPLING WILL BE DAMAGED. AS A LAST CHECK OF THE INSTALLED COUPLING, TRY TO MOVE THE SLIDE. IF IT CAN BE MOVED, OPEN THE COUPLING AND INSTALL IT WITH THE SLIDE CORRECTLY INSTALLED BETWEEN THE COULPING BODY AND THE NUT.

NOTE : Do an inspection of all duct pilots for damage before they are installed.

(2) Align the index arrows on the pneumatic pressure regulating valve and the intersect duct. Connect the intersect duct to the pneumatic pressure regulating valve with a coupling and seal. Make sure the flow arrow on the valve points inboard. Do not torque the coupling at this time.

(3) Attach the intersect duct to the low pressure check valve with a coupling and seal. Do not torque the coupling at this time.

(4) Attach the intersect duct to the tolerance take-up duct with a coupling and seal. Do not torque the coupling at this time.

(5) Connect the pneumatic pressure regulating valve to the interface duct with a coupling and seal. Do not torque the coupling at this time.

(6) Connect the pneumatic pressure regulating valve sense line. Rotate the valve as necessary to align the sense line. TORQUE the sense line nut to between 180 and 220 lbf.in. (2.03 and 2.49 m.daN). TORQUE the two clamp assemblies to between 20 and 25 lbf.in. (0.23 and 0.28 m.daN).

(7) TORQUE the couplings to between 115 and 125 lbf.in. (1.30 and 1.41 m.daN). Use a nonmarring hammer and hit the couplings lightly. TORQUE and lightly hit the couplings two more times. TORQUE the couplings to the specified value.

(8) If necessary, install the three links to the intersect duct with bolts, washers, and nuts. Adjust the lengths of the links to get a neutral/no-preload fit. TORQUE the nuts to between 50 and 70 lbf.in. (0.56 and 0.79 m.daN) and safety with safetywire.

(9) Connect the T/R valve air tubes to the interface and intersect ducts. Use couplings and seals (Ref. 78-31-05, P. Block 401).

NOTE : It is very important that the T/R valve air tubes be installed as specified.

(10) Connect sense tubes to valve and to interface duct and TORQUE tube nuts to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).

(11) Connect electrical connectors DV224A and DV224B to valve and tighten connectors fingertight plus one-eighth turn.

D. Leak Test (Ref. Fig. 403)

(1) There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No.C05-061) around the pneumatic joint or you can install aluminum foil around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
(a) Wind the foil wrap around the joint one time.
(b) Twist the seam of the foil wrap tight as shown.
(c) Make the foil wrap as tight as possible on the tube but do not rip the wrap.

(d)Attach the foil wrap with stainless steel lockwire (Material No.C10-071) at both sides of the pneumatic joint.

(2)Start the related engine (Ref. 71-00-00, P. Block 501) and keep it at idle for 5 minutes.

(3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 501).

(4)Make sure that there are no leaks at the junction between the bleed valve and the duct on the related engine.

E. Test

Perform BITE test (Ref. 36-11-00, P. Block 501, Operational Test).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

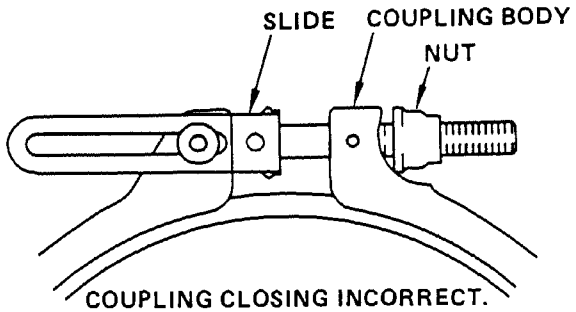
(2)Remove access platform.

(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).

(4)Remove safety clips and tags and close circuit breakers 5HA, 7HA, 11HA, 8HA, 6HA and 12HA.

(5)Remove warning notices.

INCORRECT

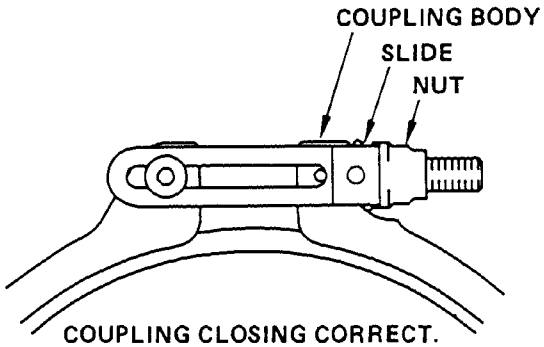


COUPLING CLOSING INCORRECT.
(SLIDE END IS NOT BETWEEN
COUPLING BODY AND NUT)

CAUTION

INCORRECT CLOSURE WILL RESULT
IN COUPLING FAILURE.

CORRECT

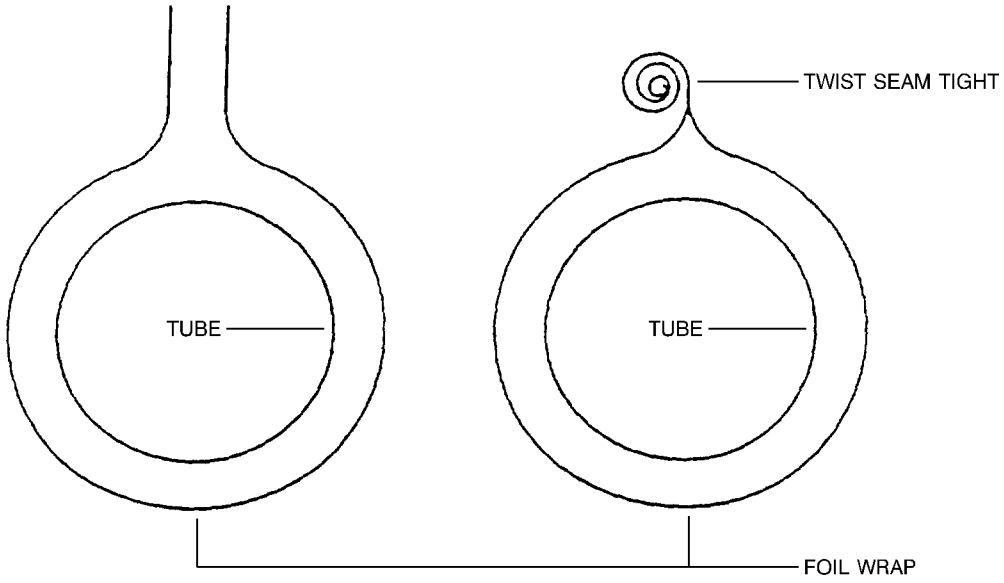


COUPLING CLOSING CORRECT.
(SLIDE END BETWEEN COUPLING
AND NUT)

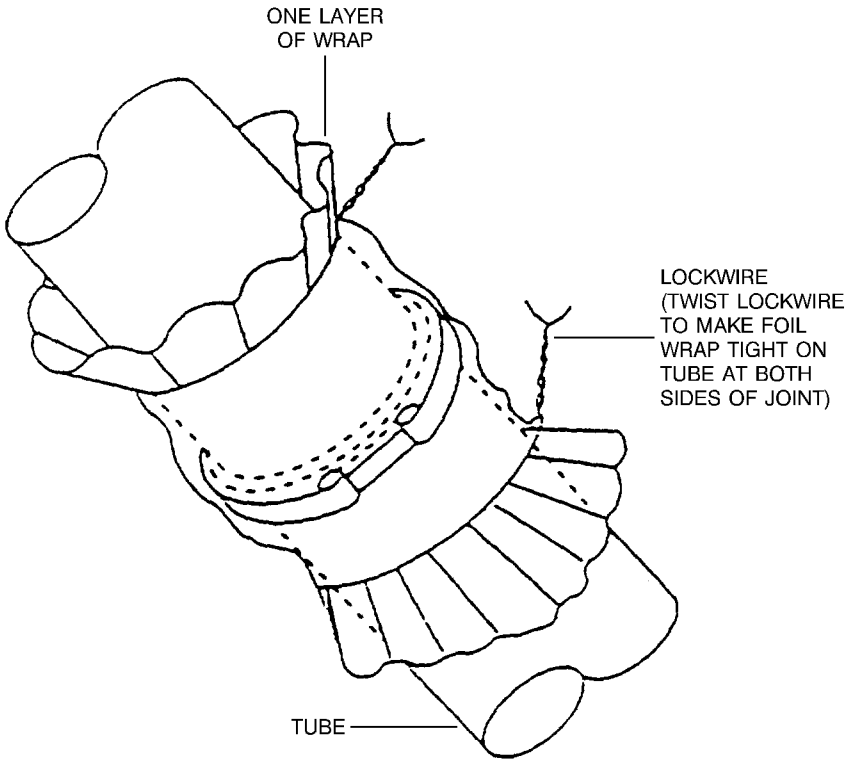
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Duct Coupling Installation Caution
Figure 402



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 14 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 403

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform 2.5 m (8 ft)
	B.	TORQUE Wrench 20 - 25 lbf.in. (0.22 - 0.28 m. daN).
	C.	TORQUE Wrench 150 - 300 lbf.in. (2.03 - 3.39 m. daN).
	D.	Circuit Breaker Safety Clips
R	E.	Plastic Mallet
R	F.	Protective Covers
R	G.	Warning Notices
R	H. Material No.P06-013	Lubricants (Ref. 70-00-00)
R	J. Material No.P05-034	Special Materials (Ref. 70-00-00)
R	K. Material No.P05-169	Special Materials (Ref. 70-00-00)
R	L. Material No.P05-289	Special Materials (Ref. 70-00-00)
	Referenced Procedures	
	- 71-13-00, P. Block 301	Cowl Doors
	- 36-11-00, P. Block 501	Engine Bleed Air Supply System
	- 71-00-00, P. Block 201	Power Plant

2. Procedure

A. Job Set-Up
(1)On AIR BLEED section of panel 436VU :
(a)Make sure that X FEED valve position pushbutton switches is released (out).
(b)Make sure that APU BLEED switch is in OFF/R position.
(c)Put a warning notice to tell persons not to operate engine bleed air system.
(2)Put warning notice on HP ground connector access door 144BR to tell persons not to pressurize pneumatic system.
(3)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG 1/CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG 1/CONTROLLER/CTL	7HA	209/A18
125VU	AIR CONDITIONING/VALVES/ENG 1 VALVES/ BLEED	11HA	501/K58
125VU	AIR CONDITIONING/ENG 2/VALVES/BLEED	12HA	501/K65
125VU	AIR CONDITIONING/ENG 2/CONTROLLER/ MONITOR	6HA	501/K62
125VU	AIR CONDITIONING/ENG 2/CONTROLLER/CTL	8HA	501/K61

(4)Open left thrust reverser doors (Ref. 71-13-00, P. Block 301).
(5)Install access platform.

B. Removal (Ref. Fig. 401)

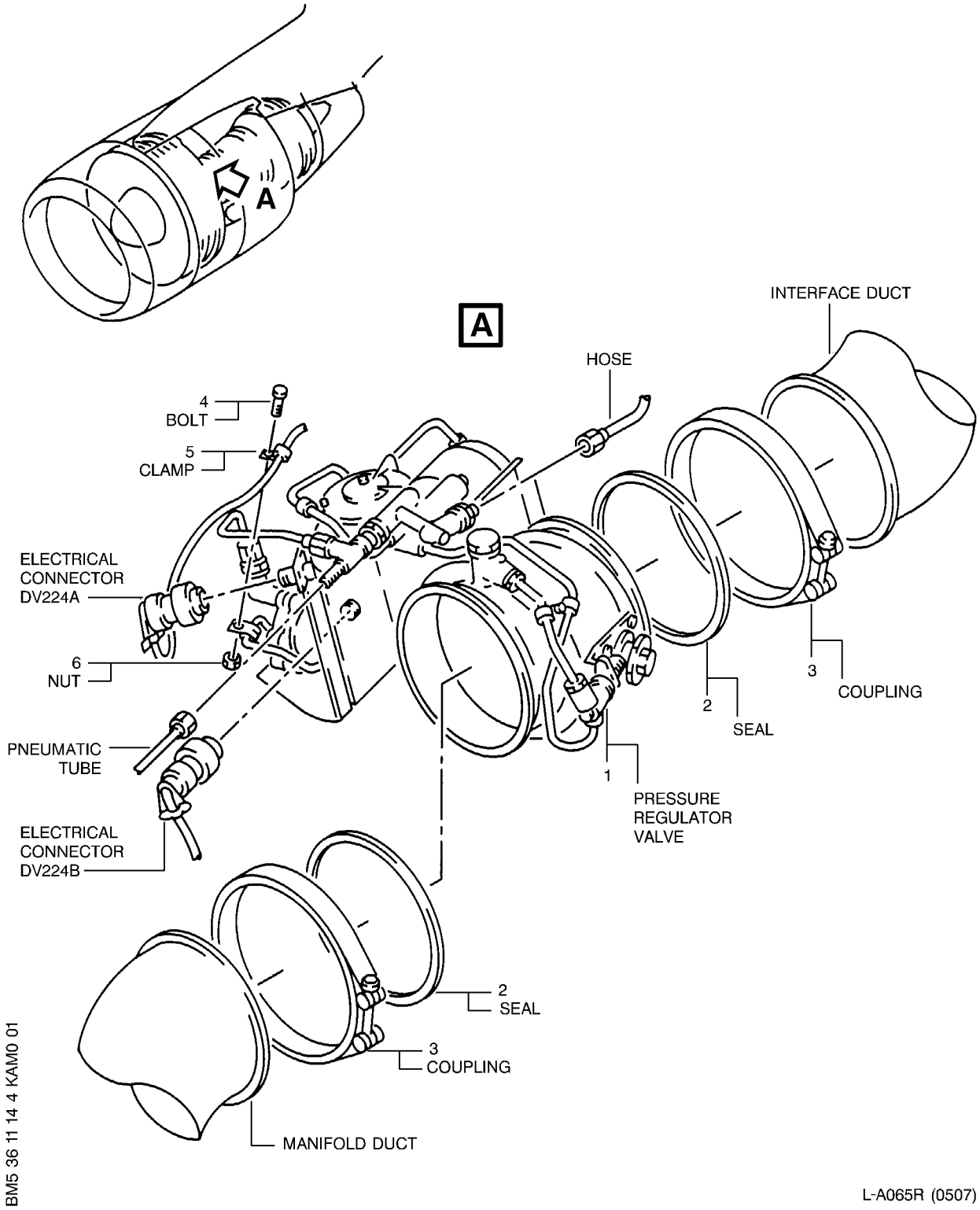
R (1)Note location and disconnect electrical connectors DV224A and DV224B
R from pressure regulator valve (1).
R (2)Remove clamps (5), bolts (4) and nuts (6) connecting wire bundle to
tube (two places).
R (3)Disconnect hose and pneumatic tube from valve (1).
R (4)Remove couplings (3), seals (2) and remove valve (1) from manifold
R duct and regulated pressure elbow duct.
R Retain seals for reinstallation.
R (5)Install protective covers on open ports of hose, pneumatic tube,
R ducts, valve (1) and electrical connectors.

C. Installation (Ref. Fig. 401)

R (1)Remove protective covers from valve (1), ducts, pneumatic tube, hose
and electrical connectors.
(2)Lubricate couplings inner surface with Material No.P06-013, and position
R couplings on upper and lower flanges of valve (1).
R (3)Install valve between regulated pressure elbow duct and manifold duct
R with couplings (3) and seals (2).
CAUTION : IMPROPER ALIGNMENT OF BLEED VALVE MAY CAUSE DAMAGE TO NACELLE COOLING SENSE LINE, NACELLE COOLING SPRAY BAR ASSEMBLY, AND/OR VALVE COUPLING WHEN CLOSING THRUST REVERSER DOORS.
ENSURE 63 DEGREE CLOCKING OF VALVE AND 0.30 IN. (7.62MM) MINIMUM GAP BETWEEN HEATSHIELD AND VALVE COUPLING
R (4)Orient valve (1) by rotating until gap between valve heatshield and
valve coupling, which attaches regulated pressure elbow to pylon
interface, measures 0.30 in. (7.62 mm).
NOTE : Adjustment of pneumatic pressure tube connectors is allowable to
R ensure correct position of valve and valve coupling (3).
R (5)Make certain that valve (1) is positioned at a 63 degree angle from
centerline. To obtain accurate measurements, position protractor on flat
surface of valve next to hexhead nut.
(Ref. Fig. 402)
R (6)Remove the protractor.
R (7)Attach wire bundle to tube (two places) with clamps (5), bolts (4) and
R nuts (6). TORQUE nut to between 20 and 25 lbf.in. (0.22 and 0.28 m.daN).
R (8)Connect electrical connectors DV224A and DV224B to valve (1). Tighten
R connectors finger tight plus one-eighth turn.
R (9)Connect hose and pneumatic tube to valve (1). TORQUE hose coupling to
R between 270 and 300 lbf.in. (3.05 and 3.39 m.daN). TORQUE pneumatic
R tube coupling to between 180 and 200 lbf.in. (2.03 and 2.26 m.daN).
R (10)TORQUE couplings (3) to the value specified on the coupling band.
R Tap on and around top surface of couplings with a plastic mallet while
R you tighten the coupling.

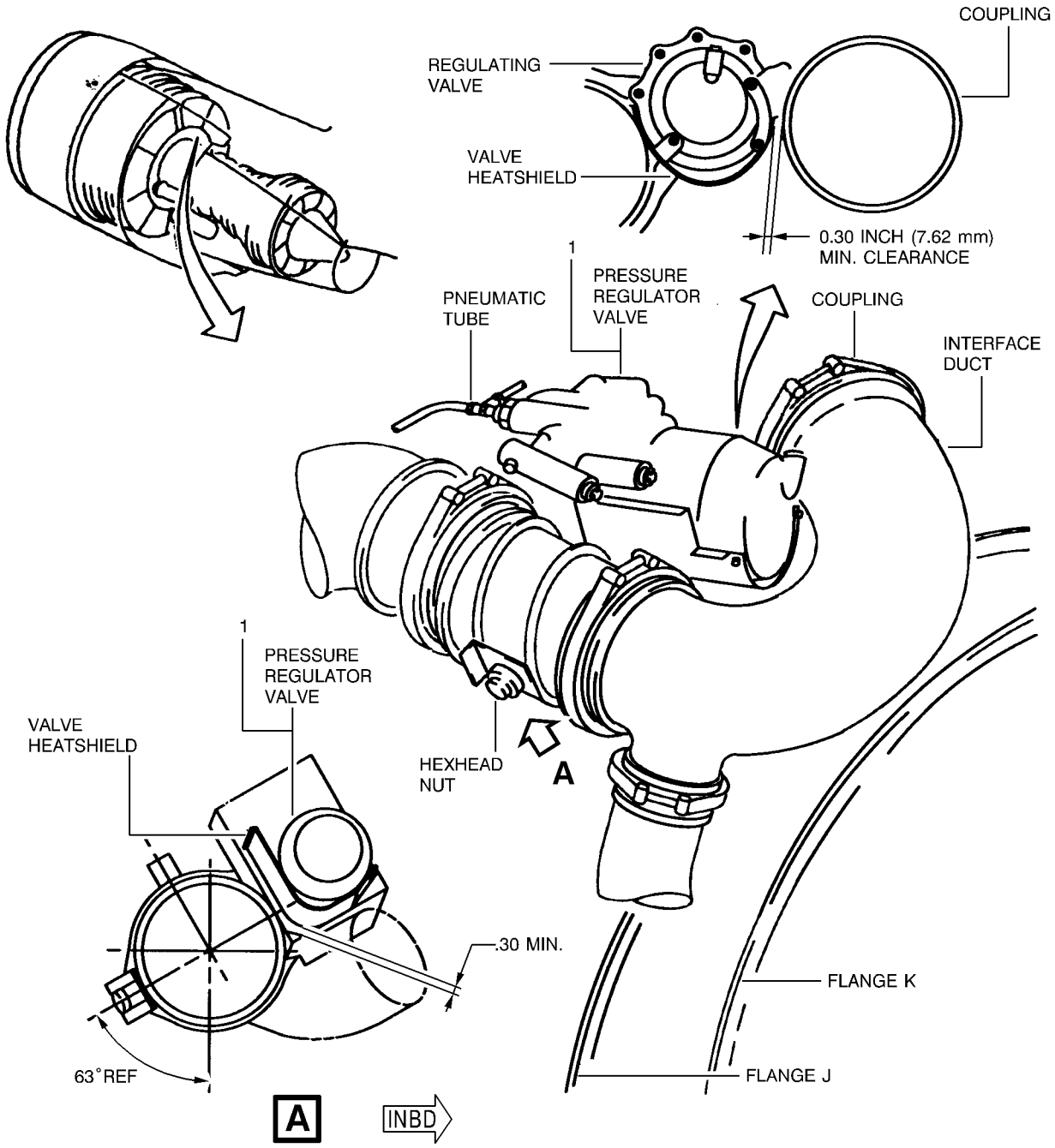
D. Leak Test (Ref. Fig. 403)

(1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No.P05-034) around the pneumatic joint or you can install aluminum foil (Material No.P05-169) around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic



Bleed Valve
Figure 401

R



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Bleed Valve Orientation
Figure 402

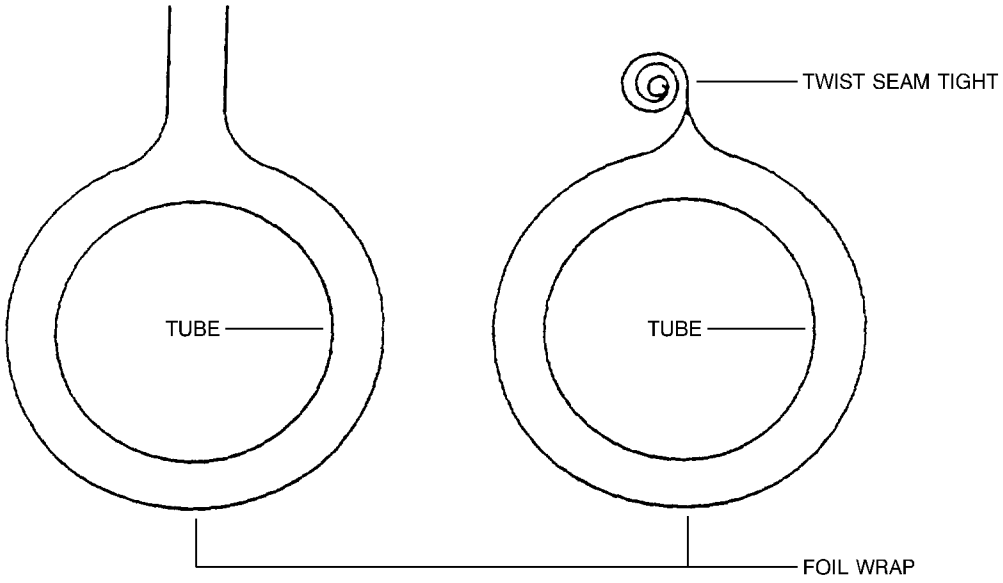
R

joint locations :
(a)Wind the foil wrap around the joint one time.
(b)Twist the seam of the foil wrap tight as shown.
(c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
(d)Attach the foil wrap with stainless steel lockwire (Material No.P05-289) at both sides of the pneumatic joint.

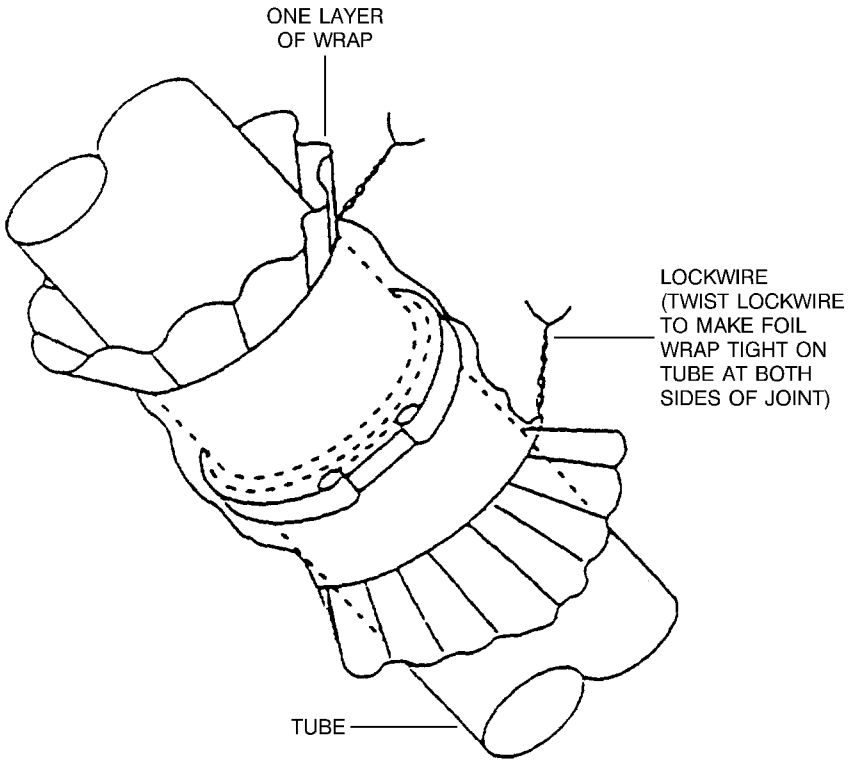
(2)Start the related engine (Ref. 71-00-00, P. Block 201) and keep it at idle for 5 minutes.
(3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 201).
(4)Make sure that there are no leaks at the junction between the bleed valve and the duct on the related engine.

E. Test
(1)Perform BITE test (Ref. 36-11-00, P. Block 501, operational test).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close left thrust reverser door (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close the circuit breakers 5HA, 7HA and 11HA (12HA, 6HA and 8HA).
(5)Remove warning notices.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 14 4 ABM0 01

R Foil Wrap Installation at Pneumatic System Joints
Figure 403

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING OPERATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.
- BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Functional Test

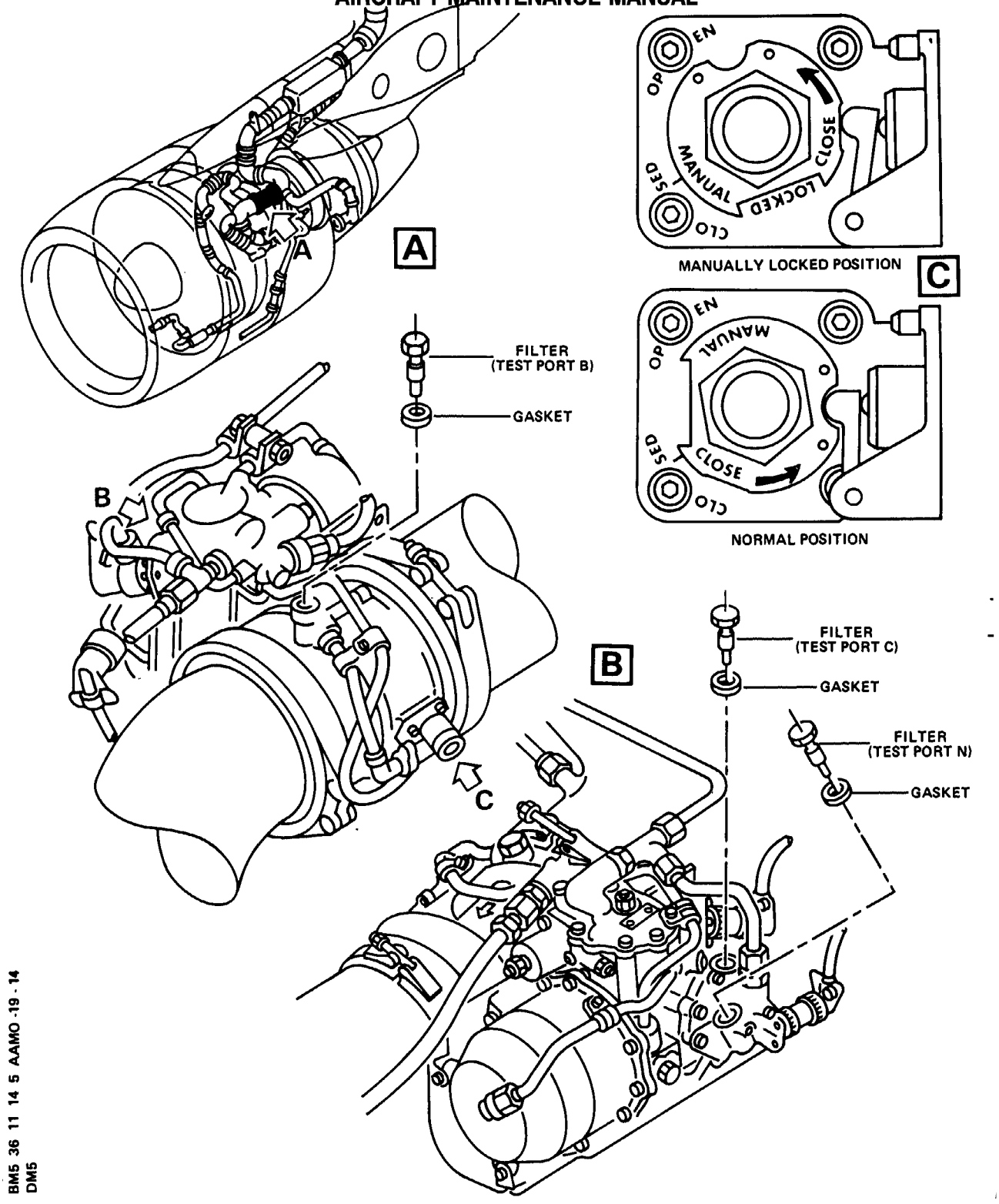
A. Equipment and Materials

ITEM	DESIGNATION
A. 290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
B.	Access Platform 3.6 m (12 ft.)
C.	Warning Notices
D.	O-Rings (2)
E.	Gasket
F.	Warning Notice
G.	Lockwire Dia. 0.8 mm (0.031 in.)
H. 290435-1-1	Adapter - Valve Test
I. 290166	Adapter - Valve Test
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-13-00, P. Block 301	Cowl Doors

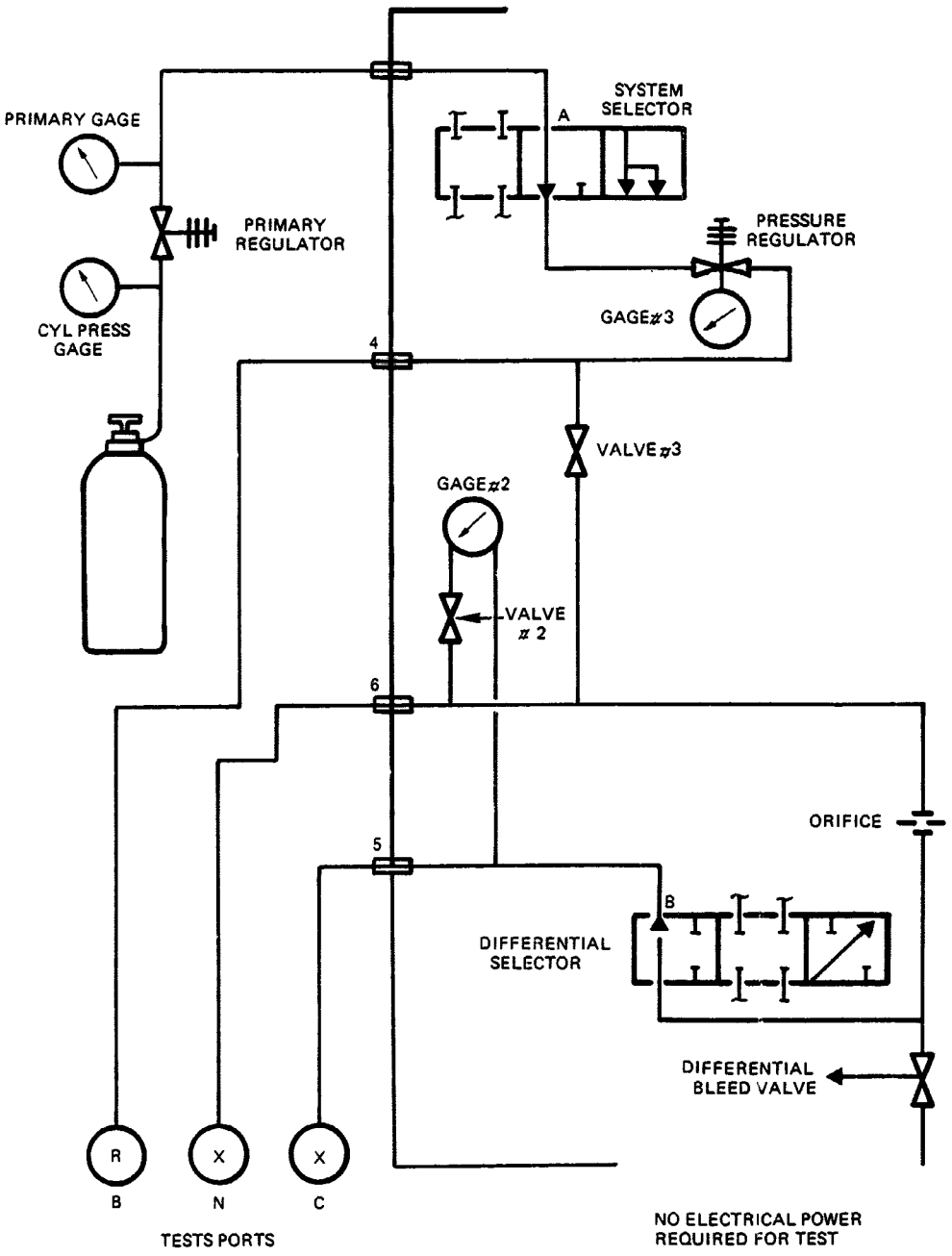
B. Procedure
(Ref. Fig. 501)
(Ref. Fig. 502)
(1)Job Set-Up
(a)Open left thrust reverser door, (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(c)On bleed valve :
- Cut and remove lockwire, remove plugs from test ports C and N.
- Install test set adapters X on ports C and N.
- Cut and remove lockwire, remove filter from test port B.
- Install test set adapter R on test port B.
- Check that valve manual override is not locked in closed position.

(d)Check that all test set controls are in OFF position.
(e)Connect test set :
- Test set outlet union No.4 to adapter R of test port B.
- Test set outlet union No.5 to adapter X of test port C.
- Test set outlet union No.6 to adapter X of test port N.

(f)Initial conditions
- Panel circuit breakers closed, particularly those associated with AIR



Bleed Valve - Test Ports
Figure 501



BM5 36 11 14 5 ACMO

Test Set - Connection Diagram
Figure 502

BLEED and AIR BLEED & COMPT TEMP.
- Correct electrical power supply.
- Forward services ventilation system in operation.

(g)On AIR BLEED section of panel 436VU
- Select ENG 1 (ENG 2) BLEED VALVE pushbutton switch AUTO (valve solenoid de-energized).

(2)Test

ACTION	RESULT
1. On test set - open cylinder shutoff valve - place SYSTEM SELECTOR in A position - place DIFFERENTIAL SELECTOR in B position - slowly increase pressure by means of PRIMARY REGULATOR until reading on PRIMARY GAGE reaches 60 psi - open SHUTOFF VALVES 2 and 3 - slowly increase pressure by means of PRESSURE REGULATOR until reading on GAGE 3 reaches 30 psi.	- valve remains closed (visual position indicator is in CLOSED position).
2. Slowly open DIFFERENTIAL BLEED VALVE while checking valve visual position indicator	- valve opens, visual position indicator moves to full OPEN position when pressure reading on GAGE 2 is equal to 1 inch of mercury (1 in. Hg).
3. On AIR BLEED section of panel 436VU. - release ENG 1 (ENG 2) BLEED VALVE pushbutton switch (OFF/R) (solenoid energized)	On AIR BLEED section of panel 436VU - OFF/R legend on BLEED VALVE pushbutton switch comes on. Valve closes, visual position indicator moves to CLOSED position.
- press ENG 1 (ENG 2) BLEED VALVE pushbutton switch (AUTO)	On AIR BLEED section of panel 436VU - OFF/R legend on BLEED VALVE pushbutton switch goes off Valve opens, visual position indicator moves to OPEN position.
4. On bleed valve - cut and remove lockwire from manual override - rotate manual override to closing detent - rotate manual override to opening detent	- valve closes, visual position indicator moves to CLOSED position. - valve opens, visual position indicator moves to OPEN position.
5. On test set - close DIFFERENTIAL BLEED VALVE	- valve closes, visual position indicator moves to closed position.

(3)Close-up
(a)On **AIR BLEED** section of panel **436VU**
- select **ENG1 (ENG2) BLEED VALVE** pushbutton switch **OFF/R**
. **OFF/R** legend on **BLEED VALVE** pushbutton switch comes on.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)On test set
- close cylinder shutoff valve
- using **PRESSURE REGULATOR,** shut down pressure until **GAGE 3** reads zero
- using **PRIMARY REGULATOR,** shut down pressure until **PRIMARY GAGE** reads zero
- place all controls in **OFF** position.

(d)Disconnect test set.
(e)On bleed valve,
- remove adapters **R** and **X** from test ports **B, C** and **N.**
- install new **O**-rings, install plugs on test ports **C** and **N** and wirelock
- check for correct condition of filter gasket, replace if necessary, install filter on test port **B** and wirelock
- make certain that manual override is in normal operating position and wirelock.

(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Remove access platform.
(h)Close engine cowls (Ref. 71-13-00, P. Block 301).
(i)Remove warning notices.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING OPERATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.
- BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

1. Functional Test

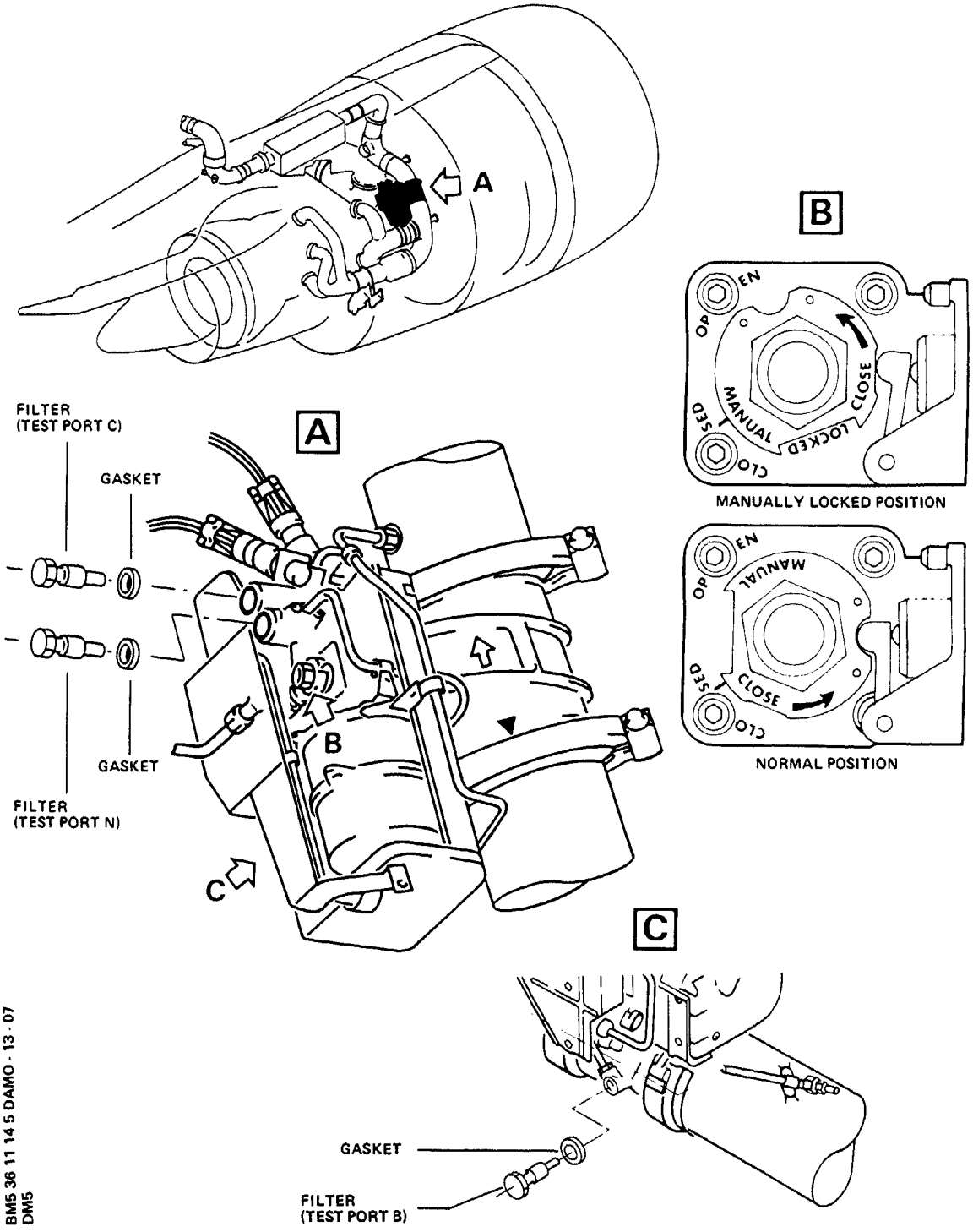
A. Equipment and Materials

ITEM	DESIGNATION
A. 290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
B.	Access Platform 3.6 m (12 ft.)
C.	Warning Notices
D.	O-Rings (2)
E.	Gasket
F.	Warning Notice
G.	Lockwire Dia. 0.8 mm (0.031 in.)
H. 290435-1-1	Adapter - Valve Test
I. 290166	Adapter - Valve Test
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 71-13-00, P. Block 301	Cowl Doors

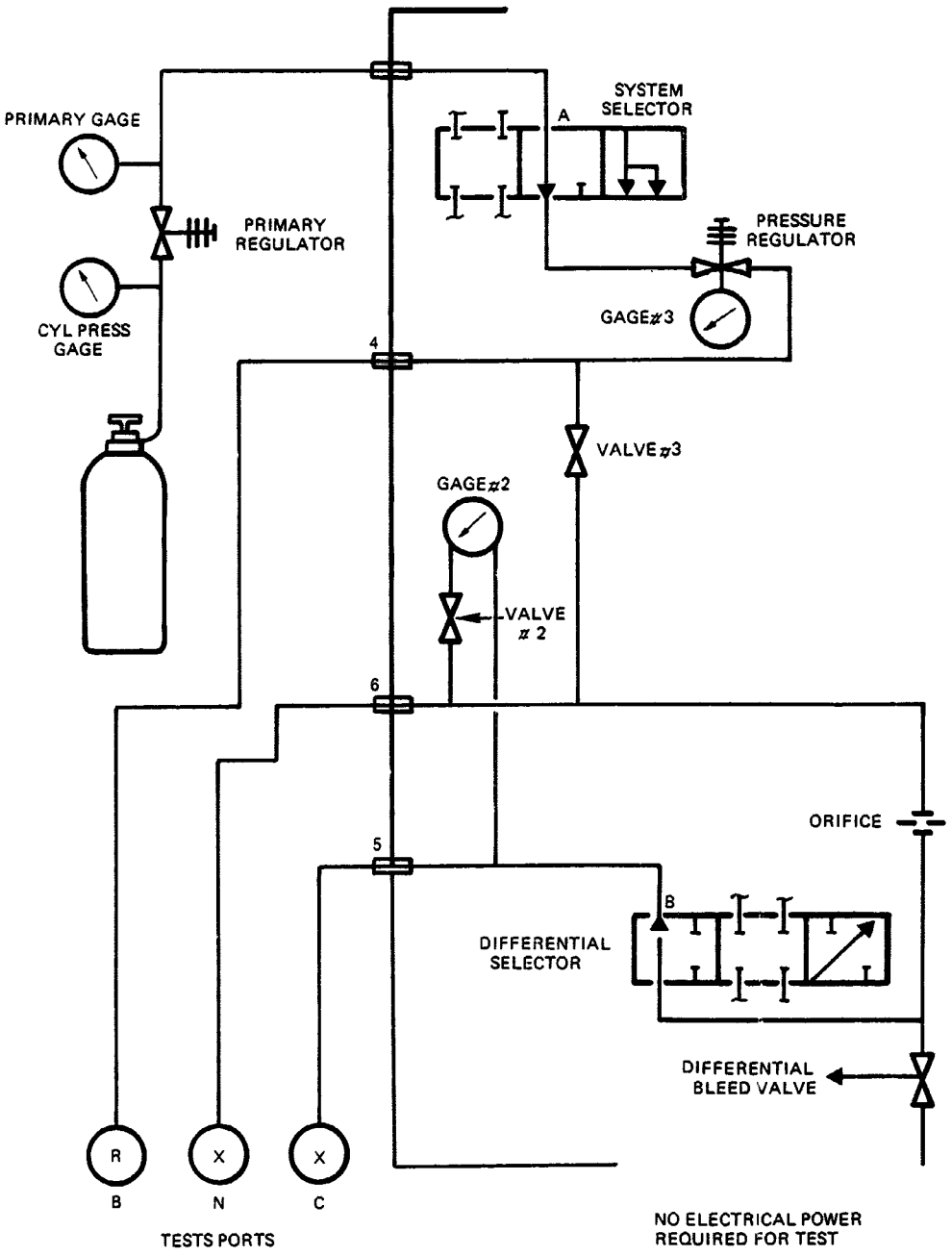
B. Procedure
(Ref. Fig. 501)
(Ref. Fig. 502)
(1)Job Set-Up
(a)Open right thrust reverser door, (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(c)On bleed valve :
- Cut and remove lockwire, remove plugs from test ports C and N.
- Install test set adapters X on ports C and N.
- Cut and remove lockwire, remove filter from test port B.
- Install test set adapter R on test port B.
- Check that valve manual override is not locked in closed position.

(d)Check that all test set controls are in OFF position.
(e)Connect test set :
- Test set outlet union No.4 to adapter R of test port B.
- Test set outlet union No.5 to adapter X of test port C.
- Test set outlet union No.6 to adapter X of test port N.

(f)Initial conditions
- Panel circuit breakers closed, particularly those associated with AIR



Bleed Valve - Test Ports
Figure 501



BM5 36 11 14 5 ACMO

Test Set - Connection Diagram
Figure 502

BLEED and AIR BLEED & COMPT TEMP.
- Correct electrical power supply.
- Forward services ventilation system in operation.

(g)On AIR BLEED section of panel 436VU
- Select ENG 1 (ENG 2) BLEED VALVE pushbutton switch AUTO (valve solenoid de-energized).

(2)Test

ACTION	RESULT
1. On test set - open cylinder shutoff valve - place SYSTEM SELECTOR in A position - place DIFFERENTIAL SELECTOR in B position - slowly increase pressure by means of PRIMARY REGULATOR until reading on PRIMARY GAGE reaches 60 psi - open SHUTOFF VALVES 2 and 3 - slowly increase pressure by means of PRESSURE REGULATOR until reading on GAGE 3 reaches 30 psi.	- valve remains closed (visual position indicator is in CLOSED position).
2. Slowly open DIFFERENTIAL BLEED VALVE while checking valve visual position indicator	- valve opens, visual position indicator moves to full OPEN position when pressure reading on GAGE 2 is equal to 1 inch of mercury (1 in. Hg).
3. On AIR BLEED section of panel 436VU. - release ENG 1 (ENG 2) BLEED VALVE pushbutton switch (OFF/R) (solenoid energized)	On AIR BLEED section of panel 436VU - OFF/R legend on BLEED VALVE pushbutton switch comes on. Valve closes, visual position indicator moves to CLOSED position.
- press ENG 1 (ENG 2) BLEED VALVE pushbutton switch (AUTO)	On AIR BLEED section of panel 436VU - OFF/R legend on BLEED VALVE pushbutton switch goes off Valve opens, visual position indicator moves to OPEN position.
4. On bleed valve - cut and remove lockwire from manual override - rotate manual override to closing detent - rotate manual override to opening detent	- valve closes, visual position indicator moves to CLOSED position. - valve opens, visual position indicator moves to OPEN position.
5. On test set - close DIFFERENTIAL BLEED VALVE	- valve closes, visual position indicator moves to closed position.

(3)Close-up
(a)On AIR BLEED section of panel 436VU
- select ENG1 (ENG2) BLEED VALVE pushbutton switch OFF/R
. OFF/R legend on BLEED VALVE pushbutton switch comes on.

(b)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(c)On test set
- close cylinder shutoff valve
- using PRESSURE REGULATOR, shut down pressure until GAGE 3 reads zero
- using PRIMARY REGULATOR, shut down pressure until PRIMARY GAGE reads zero
- place all controls in OFF position.

(d)Disconnect test set.
(e)On bleed valve,
- remove adapters R and X from test ports B, C and N.
- install new O-rings, install plugs on test ports C and N and wirelock
- check for correct condition of filter gasket, replace if necessary, install filter on test port B and wirelock
- make certain that manual override is in normal operating position and wirelock.

(f)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(g)Remove access platform.
(h)Close engine cowls (Ref. 71-13-00, P. Block 301).
(i)Remove warning notices.

BLEED VALVE - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.

1. Reason for the Job
Check for correct condition of filter.

2. Equipment and Materials

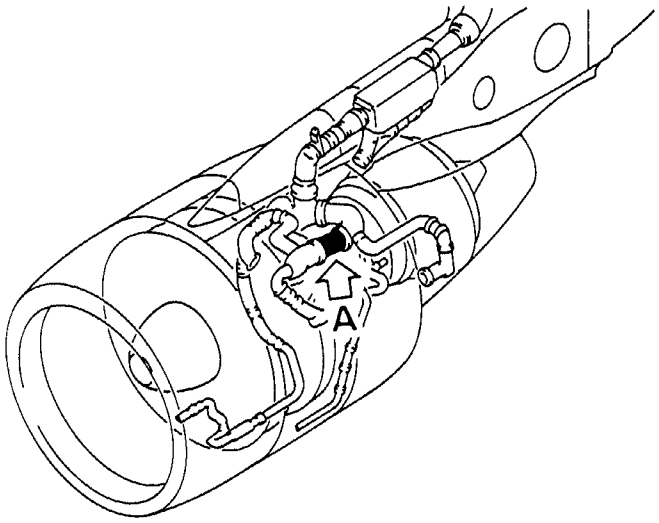
ITEM	DESIGNATION
A.	Access Platform 3.6 m (12 ft.)
B.	Corrosion-Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
C.	Gasket
D.	Blanking Plugs/Caps
E.	Warning Notice
F. Material No. 11-002	Cleaning Agent (Ref. 20-31-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

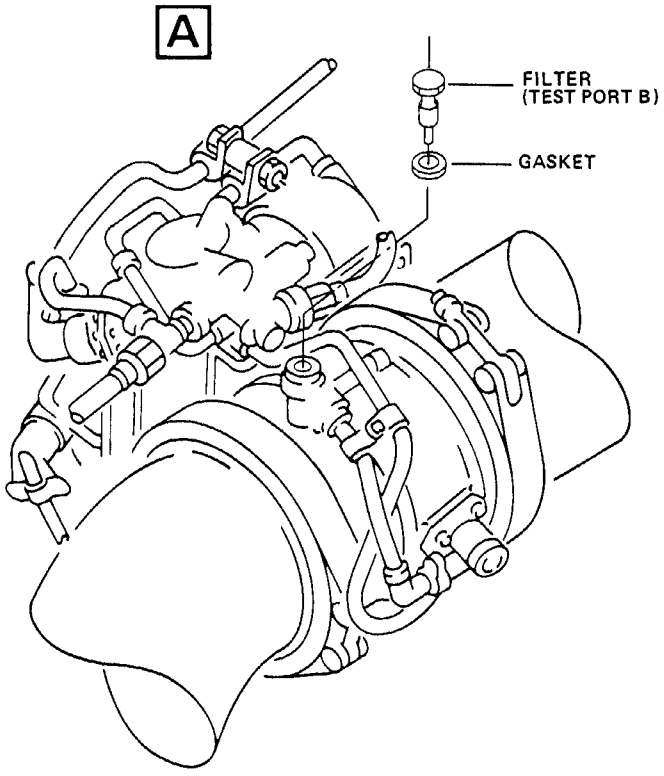
3. Procedure
(Ref. Fig. 601)

A. Job Set-Up
(1)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Position access platform.

B. Inspection/Check
(1)Cut and remove lockwire, remove filter and gasket from test port B. Discard gasket.
(2)Blank off filter orifice on valve.
(3)Clean filter with Material No.11-002 or by ultrasonic method.
(4)Check filter for corrosion, clogging or damage. Replace if necessary.
(5)Remove blanking cap and install gasket on filter ; install filter on test port B and wirelock.

C. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser door (Ref. 71-13-00, P. Block 301).
(4)Remove warning notice.





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Bleed Valve
Figure 601

BLEED VALVE - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.

1. Reason for the Job
Check for correct condition of filter.

2. Equipment and Materials

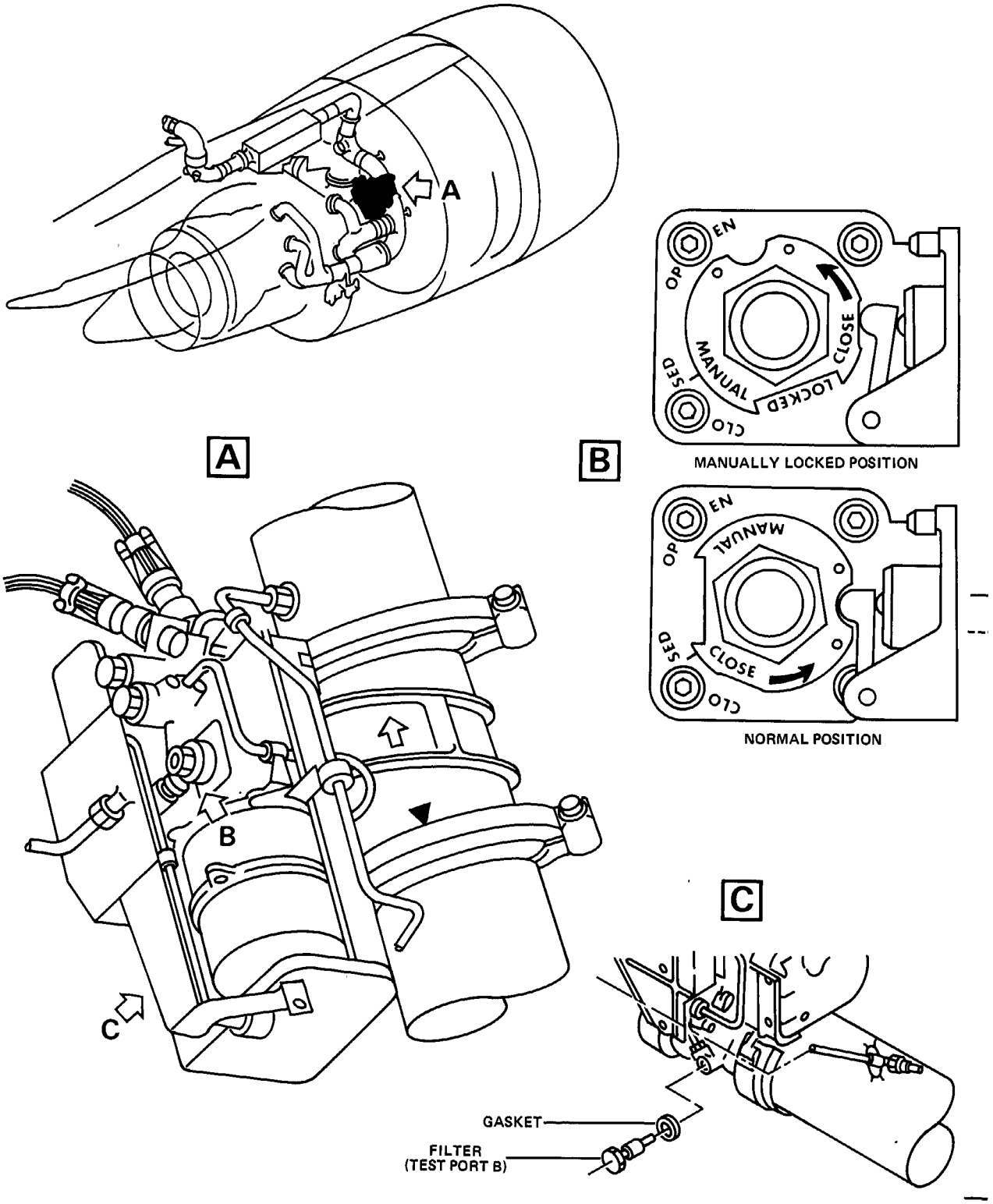
ITEM	DESIGNATION
A.	Access Platform 3.6 m (12 ft.)
B.	Corrosion-Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
C.	Gasket
D.	Blanking Plugs/Caps
E.	Warning Notice
F. Material No. 11-002	Cleaning Agent (Ref. 20-31-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

3. Procedure
(Ref. Fig. 601)

A. Job Set-Up
(1)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Position access platform.

B. Inspection/Check
(1)Cut and remove lockwire, remove filter and gasket from test port B. Discard gasket.
(2)Blank off filter orifice on valve.
(3)Clean filter with Material No.11-002 or by ultrasonic method.
(4)Check filter for corrosion, clogging or damage. Replace if necessary.
(5)Remove blanking cap and install gasket on filter ; install filter on test port B and wirelock.

C. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser door (Ref. 71-13-00, P. Block 301).
(4)Remove warning notice.



Bleed Valve
Figure 601

BLEED VALVE - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Item 6
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY A WARNING NOTICE ON THE HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Deactivation

A. Reason for the Job
To permit dispatch of the aircraft with one air bleed system bleed valve inoperative, provided that this bleed valve is secured in closed position and associated BLEED VALVE pushbutton switch selected OFF/R.

B. Equipment and Materials

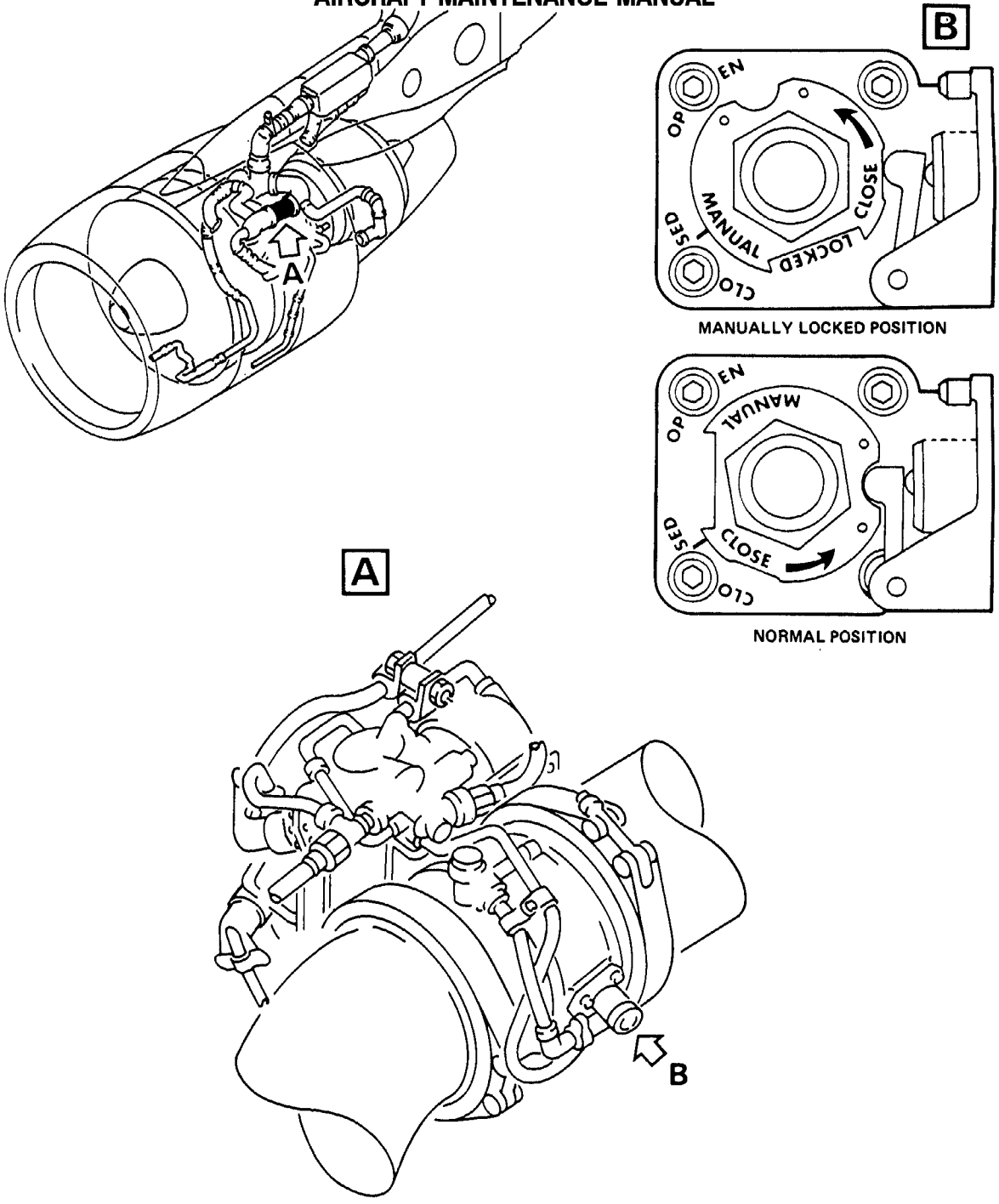
ITEM	DESIGNATION
1.	Access Platform 3.60 m (12 ft.)
2.	Warning Notices
3.	Circuit Breaker Safety Clips
4.	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(Ref. Fig. 901)

(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68

(b)Position access platform.
(c)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Deactivation
(a)On AIR BLEED section of panel 436VU, release ENG 1 (ENG 2) BLEED VALVE pushbutton switch (OFF/R).
(b)Manually place bleed valve in CLOSED position and secure manual



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Bleed Valve
Figure 901

override with lockwire.

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Remove warning notices.

(c)Close engine cowls (Ref. 71-13-00, P. Block 301).

(d)Remove access platform.

(e)Remove safety clips and tags and close circuit breakers.

(f)Install a temporary placard in the flight compartment to warn the flight crew that engine 1 (2) valve is deactivated.

(g)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 3.60 m (12 ft.)
2.	Circuit Breaker Safety Clips
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74

(b)Position access platform.

(c)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).

(2)Reactivation

R (a)Remove lockwire, turn manual override (clockwise) to normal configu-
R ration and secure manual override with lockwire.

(b)Troubleshoot the system (Ref. TSM Chapter 36-11).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Remove temporary placard.

(c)Clear technical log.

(d)Close engine cowls (Ref. 71-13-00, P. Block 301).

(e)Remove access platform.

(f)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH,

1KM, 2KM).

BLEED VALVE - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Item 6
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY A WARNING NOTICE ON THE HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Deactivation

A. Reason for the Job
To permit dispatch of the aircraft with one air bleed system bleed valve inoperative, provided that this bleed valve is secured in closed position and associated BLEED VALVE pushbutton switch selected OFF/R.

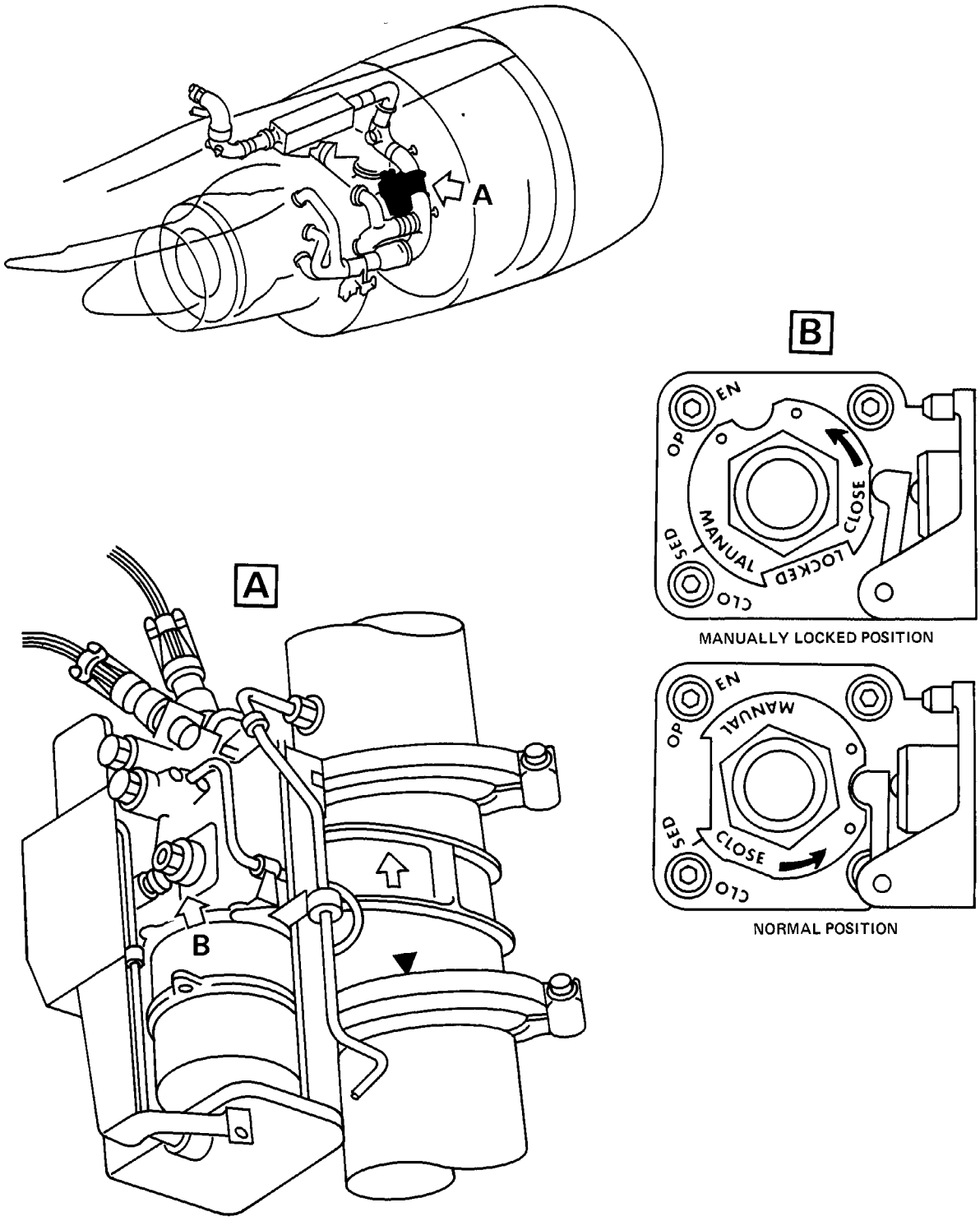
B. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 3.60 m (12 ft.)
2.	Warning Notices
3.	Circuit Breaker Safety Clips
4.	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68

(b)Position access platform.
(c)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Deactivation
(a)On AIR BLEED section of panel 436VU, release ENG 1 (ENG 2) BLEED VALVE pushbutton switch (OFF/R).
(b)Manually place bleed valve in CLOSED position and secure manual override with lockwire.



Bleed Valve
Figure 901

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove warning notices.
(c)Close engine cowls (Ref. 71-13-00, P. Block 301).
(d)Remove access platform.
(e)Remove safety clips and tags and close circuit breakers.
(f)Install a temporary placard in the flight compartment to warn the flight crew that engine 1 (2) valve is deactivated.
(g)Make an entry in the aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 3.60 m (12 ft.)
2.	Circuit Breaker Safety Clips
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74

(b)Position access platform.
(c)Open right thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Reactivation
(a)Remove lockwire, turn manual override (clockwise) to normal configuration and secure manual override with lockwire.
(b)Troubleshoot the system (Ref. TSM Chapter 36-11).
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove temporary placard.
(c)Clear technical log.
(d)Close engine cowls (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.
(f)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM, 2KM).

BLEED AIR PRECOOLER - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
- START UP OF APPROPRIATE ENGINE
- PRESSURIZATION OF PNEUMATIC SYSTEM.

1. Equipment and Materials

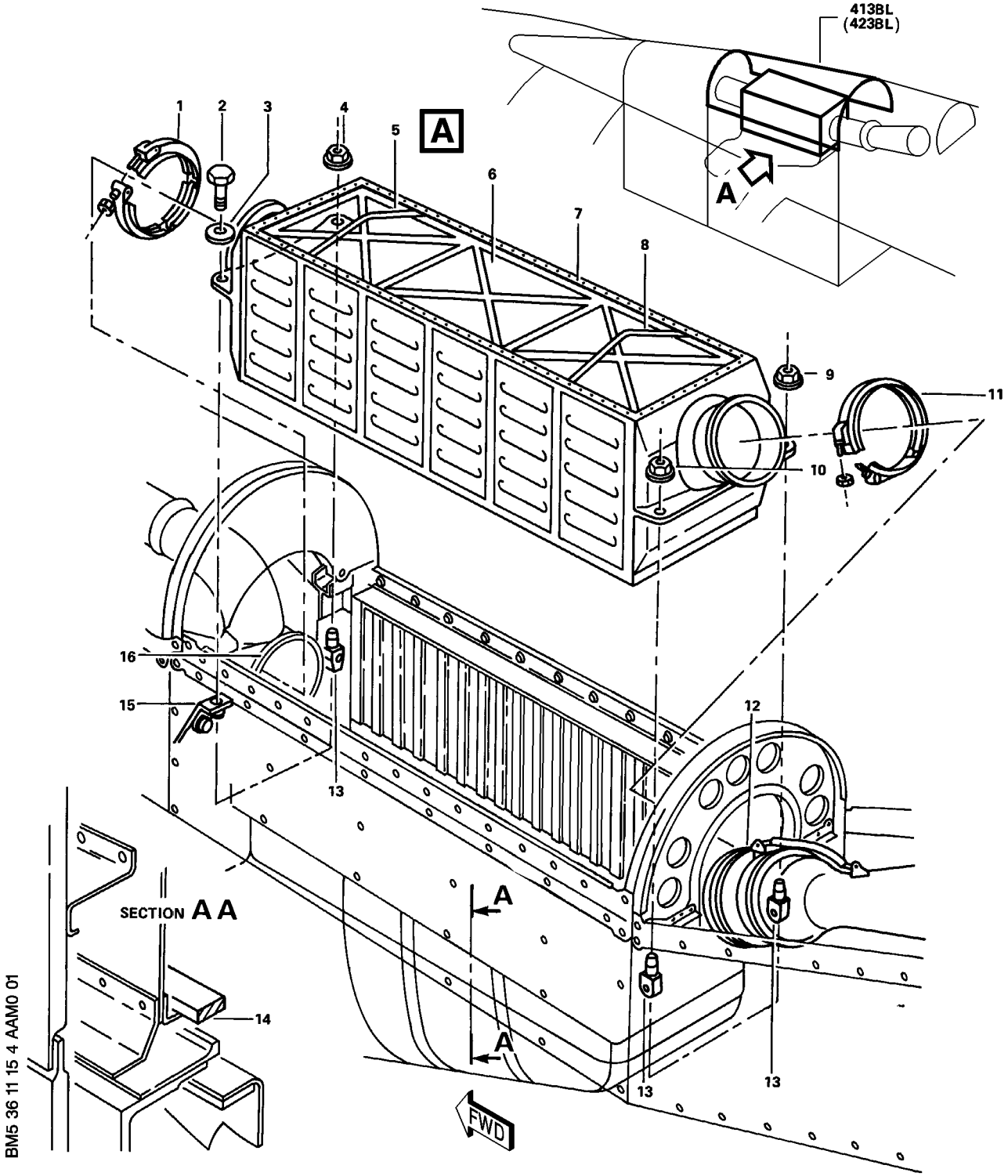
ITEM	DESIGNATION
A.	Access Platform 4.5 m (14 ft.)
B.	Warning Notices
C.	Sling
D.	Light Pulley Block
E.	Blanking Plugs/Caps
F. Material No. 08-004	Bonding and Adhesive Compounds (Ref. 20-31-00)
G. Material No. 04-009	Common Greases (Ref. 20-31-00)
R H. Material No. P05-034	Special Materials (Ref. 70-00-00)
R J. Material No. P05-169	Special Materials (Ref. 70-00-00)
R K. Material No. P05-289	Special Materials (Ref. 70-00-00)
R Referenced Procedures	
R - 29-21-00, P. Block 301	Green Auxiliary Power
R - 24-41-00, P. Block 301	AC External Power Control
R - 36-11-00, P. Block 601	Engine Bleed Air Supply System
R - 71-00-00, P. Block 201	Engine

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up
(1)Retract slats.
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(c)On center pedestal
- place flap and slat control lever in first notch position.
- display warning notice prohibiting operation of flap and slat control lever.
(d)Depressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Position access platform.
R (3)Remove access door 413BL (423BL).

B. Removal
(1)Remove clamps (1) and (11).
(2)Push female half of downstream duct (12) rearwards to clear it from



Bleed Air Precooler
Figure 401

R

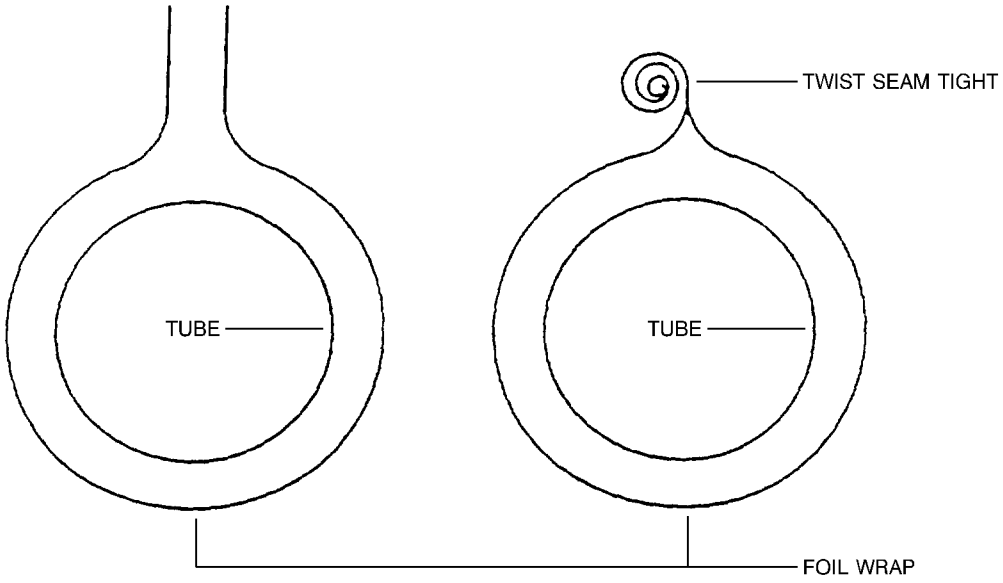
flange of precooler (6).
(3)Remove nuts and washers (4), (9) and (10).
(4)Remove screw (2) and washer (3).
(5)Position sling on lifting bars (5) and (8).
(6)Remove precooler (6) using light pulley block.
(7)Cap open ends of ducts (12) and (16).

C. Installation
(1)Clean and inspect precooler interface and/or adjacent area. Check for correct condition of attaching parts; replace if necessary. Smear hinges with Material No. 04-009.
NOTE : Make certain that the two structural rods located under the precooler are installed.
(2)Check for correct condition of seal (14); replace if necessary.
NOTE : Seal (14) is cemented with Material No. 08-004 (Ref. 20-31-00).
(3)Remove blanking plugs/caps from ducts (12) and (16) and check for correct condition of flanges.
(4)Install sling on precooler (6) lifting bars (5) and (8).
(5)Using pulley block, install precooler (6) in its housing in pylon on precooler mounting studs (13) and bracket (15), (arrow indicating airflow direction pointing rearwards).
(6)Install nuts and washers (4), (9) and (10) on mounting studs (13); install washer (3) and screw (2) on bracket (15). Do not tighten at this stage.
(7)Install clamps (1) and (11). Tighten nuts, TORQUE to value given on clamps.
(8)Tighten attachment nuts (4), (9) and (10) and attachment screw of precooler (6).

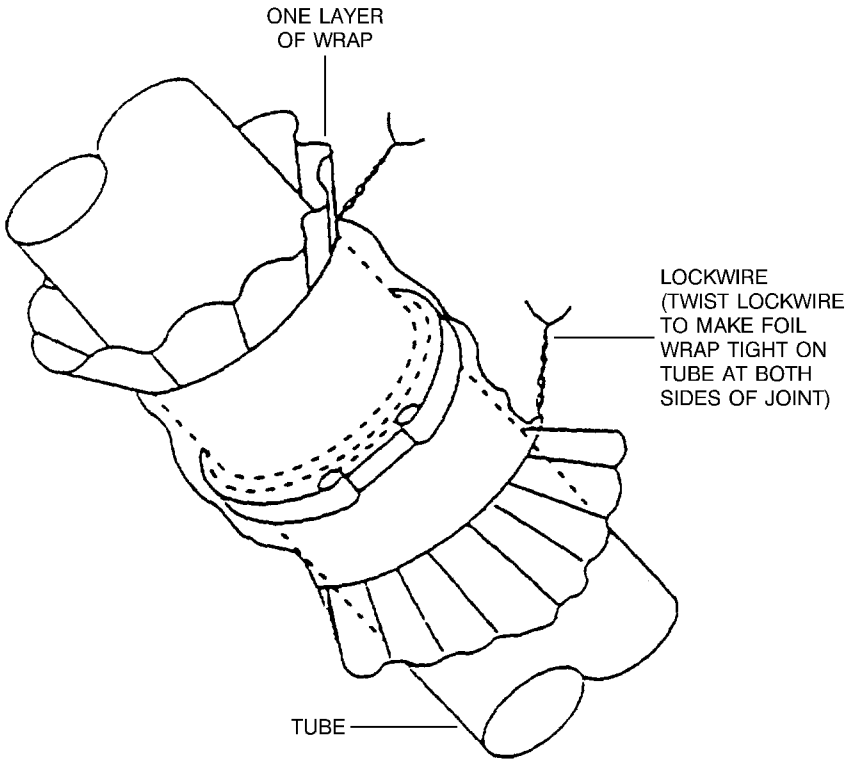
R D. Leak Test (Ref. Fig. 402)
R (1)There are two possible procedures to find the location of a pneumatic joint air leak.
R (a)You can apply developer, dry (Material No.P05-034) around the pneumatic joint.
R NOTE : Apply dry developer only on the connections of the removed pneumatic components. Do not apply dry developer on all the pneumatic components.
R (b)You can install aluminum foil (Material No.P05-169) around the pneumatic joint locations.
R Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
R 1 Wind the foil wrap around the joint one time.
R 2 Twist the seam of the foil wrap tight as shown.
R 3 Make the foil wrap as tight as possible on the tube but do not rip the wrap.
R 4 Attach the foil wrap with stainless steel lockwire (Material No.P05-289) at both sides of the pneumatic joint.
R (2)Pressurize the pneumatic system :
R (a)Start the related engine (Ref. 71-00-00, P. Block 201) and keep it at idle for 5 minutes.
R (b)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 201).

R NOTE : You can use the following alternative methods to pressurize
R the pneumatic system :
R - Pressurize the pneumatic system via the HP ground connectors
R (Ref. 36-11-00, P. Block 601).
R - Pressurize the pneumatic system with the APU (Ref. 36-11-00,
R P. Block 601).
R (3)Make sure that there are no leaks at the junction between the bleed
R air precooler and the duct on the related engine.

R E. Close-Up
R (1)Remove light pulley block.
R (2)Make certain that working area is clean and clear of tools and miscel-
R laneous items of equipment.
R (3)Install access door 413BL (423BL).
R (4)Remove access platform.
R (5)Remove warning notices :
R - concerning engine start up and system pressurization
R - concerning flap and slat control lever.
R (6)Remove all ground handling and maintenance equipment, standard and
R special tools together with ground power equipment, all access equipment
R and miscellaneous items.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 15 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 402

R

BLEED AIR PRECOOLER - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
- START UP OF APPROPRIATE ENGINE
- PRESSURIZATION OF PNEUMATIC SYSTEM.

1. Equipment and Materials

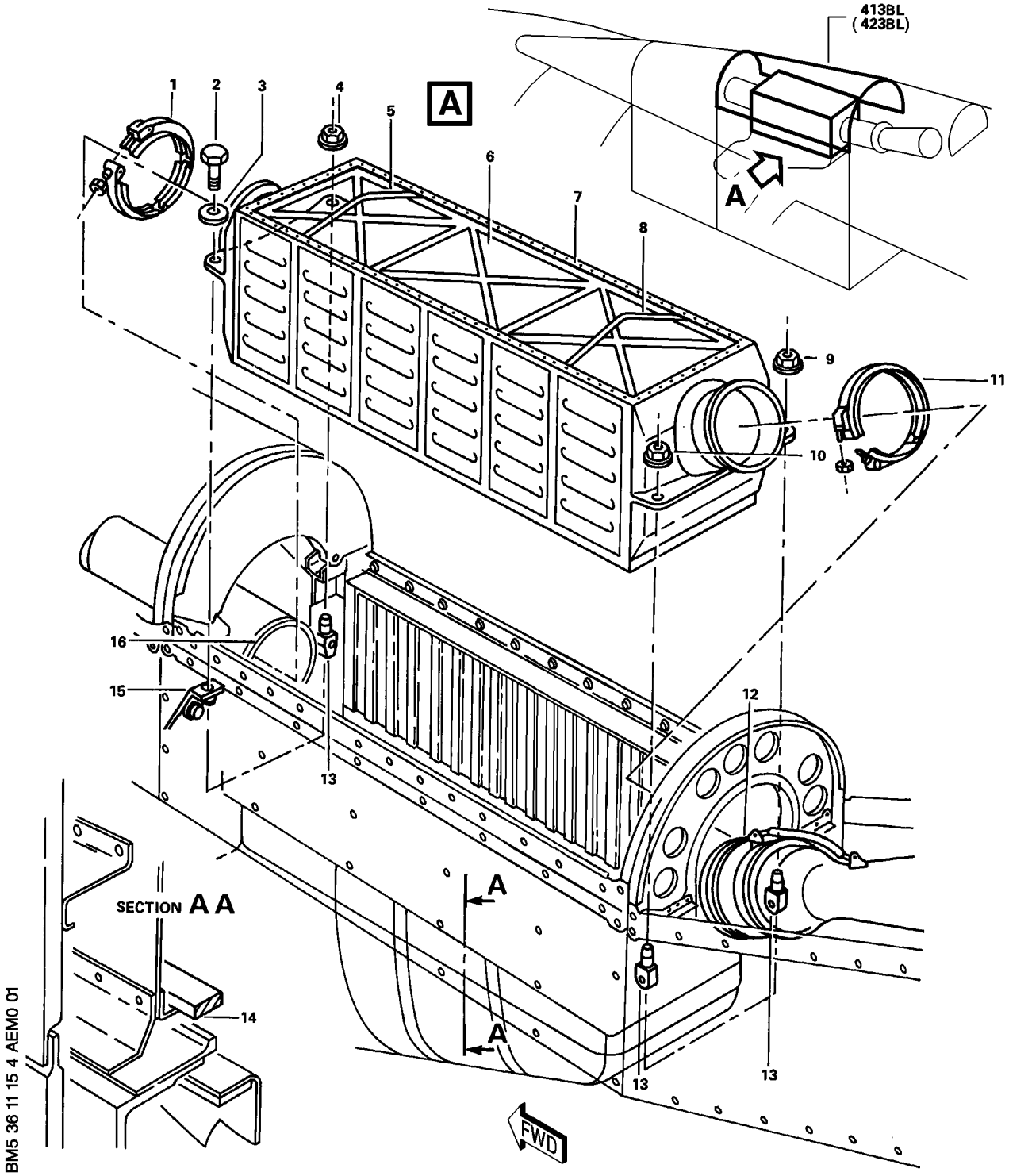
ITEM	DESIGNATION
A.	Access Platform 4.5 m (14 ft.)
B.	Warning Notices
C.	Sling
D.	Light Pulley Block
E.	Blanking Plugs/Caps
F.	Aluminum Foil
G. Material No. 04-009	Common Greases (Ref. 20-31-00)
H. Material No. 08-004	Bonding and Adhesive Compounds (Ref. 20-31-00)
J. Material No. C05-061	Special Materials (Ref. 70-00-00)
K. Material No. C10-071	Special Materials (Ref. 70-00-00)
Referenced Procedures	
- 29-21-00, P. Block 301	Green Auxiliary Power
- 24-41-00, P. Block 301	AC External Power Control
- 36-11-00, P. Block 601	Engine Bleed Air Supply System
- 71-00-00, P. Block 501	Power Plant

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up
(1)Retract slats.
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Pressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(c)On center pedestal
- place flap and slat control lever in first notch position.
- display warning notice prohibiting operation of flap and slat control lever.
(d)Depressurize Green auxiliary hydraulic system (Ref. 29-21-00, P. Block 301).
(e)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Position access platform.
(3)Remove access door 413BL (423BL).

B. Removal
(1)Remove clamps (1) and (11).
(2)Push female half of downstream duct (12) rearwards to clear it from flange of precooler (6).



Bleed Air Precooler
Figure 401

(3)Remove nuts and washers (4), (9) and (10).
(4)Remove screw (2) and washer (3).
(5)Position sling on lifting bars (5) and (8).
(6)Remove precooler (6) using light pulley block.
(7)Cap open ends of ducts (12) and (16).

C. Installation
(1)Clean and inspect precooler interface and/or adjacent area. Check for correct condition of attaching parts; replace if necessary. Smear hinges with Material No. 04-009.
NOTE : Make certain that the two structural rods located under the precooler are installed.
(2)Check for correct condition of seal (14); replace if necessary.
NOTE : Seal (14) is cemented with Material No. 08-004 (Ref. 20-31-00).
(3)Remove blanking plugs/caps from ducts (12) and (16) and check for correct condition of flanges.
(4)Install sling on precooler (6) lifting bars (5) and (8).
(5)Using pulley block, install precooler (6) in its housing in pylon on precooler mounting studs (13) and bracket (15), (arrow indicating airflow direction pointing rearwards).

(6)Install nuts and washers (4), (9) and (10) on mounting studs (13); install washer (3) and screw (2) on bracket (15). Do not tighten at this stage.
(7)Install clamps (1) and (11). Tighten nuts, TORQUE to value given on clamps.
(8)Tighten attachment nuts (4), (9) and (10) and attachment screw of precooler (6).

D. Leak Test (Ref. Fig. 402)
(1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No. C05-061) around the pneumatic joint or you can install aluminum foil around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
(a)Wind the foil wrap around the joint one time.
(b)Twist the seam of the foil wrap tight as shown.
(c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
(d)Attach the foil wrap with stainless steel lockwire (Material No. C10-071) at both sides of the pneumatic joint.
(2)Pressurize the pneumatic system :
(a)Start the related engine (Ref. 71-00-00, P. Block 501) and keep it at idle for 5 minutes.
(b)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 501).
NOTE : You can use the following alternative methods to pressurize the pneumatic system :
- Pressurize the pneumatic system via the HP ground connectors (Ref. 36-11-00, P. Block 601).
- Pressurize the pneumatic system with the APU (Ref. 36-11-00,

P. Block 601).

(3)Make sure that there are no leaks at the junction between the bleed air precooler and the duct on the related engine.

E. Close-Up

(1)Remove light pulley block.

(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

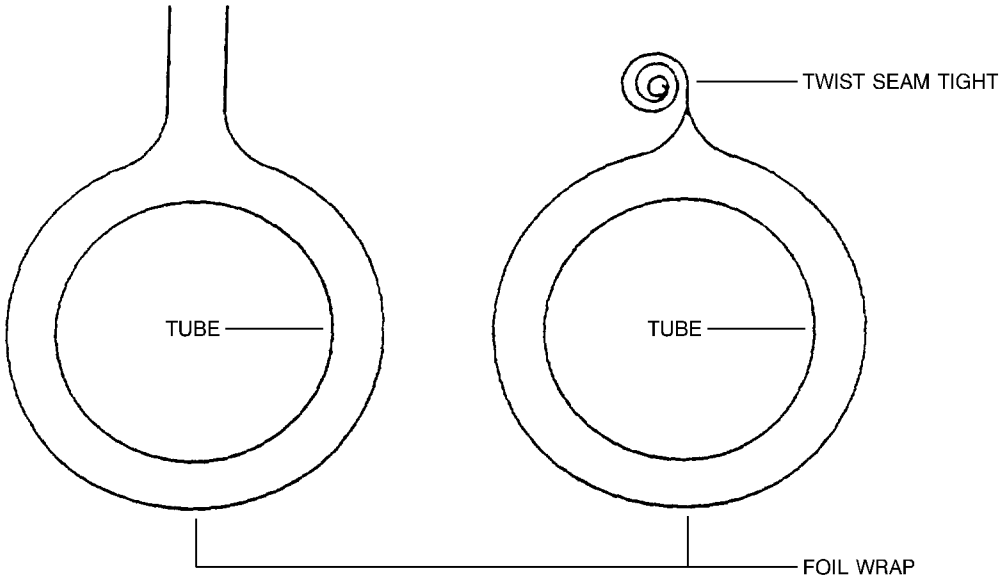
(3)Install access door 413BL (423BL).

(4)Remove access platform.

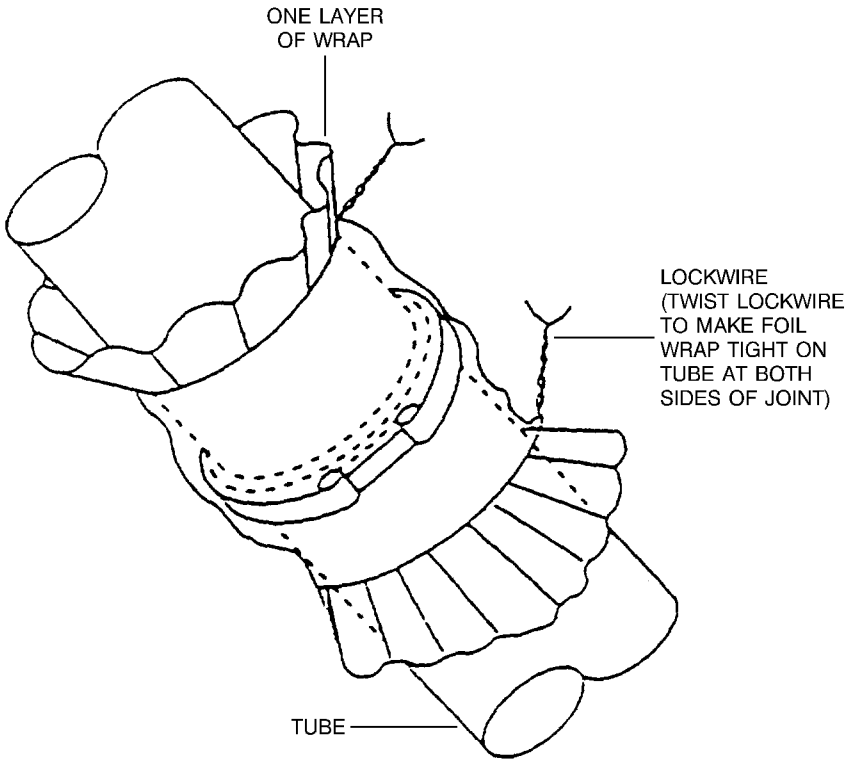
(5)Remove warning notices :

- concerning engine start up and system pressurization
- concerning flap and slat control lever.

(6)Remove all ground handling and maintenance equipment, standard and special tools together with ground power equipment, all access equipment and miscellaneous items.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 15 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 402

FAN AIR VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF THE APPROPRIATE ENGINE
. PRESSURIZATION OF THE PNEUMATIC SYSTEM.

1. Equipment and Materials

	ITEM	DESIGNATION
	A.	Access Platform 2.5 m (8 ft.)
	B.	Torque Wrench 0 to 0.9 m. daN (0 to 80 lbf. in.)
	C.	Circuit Breaker Safety Clips
	D.	Lockwire Dia. 0.5 mm (0.02 in.)
	E.	Warning Notices
	F.	Blanking Plugs/Caps
R	G. Material No. 09-018	Sealant (Ref. 20-31-00)
R	H. Material No. 11-002	Cleaning Agents (Ref. 20-31-00)
R	J. Material No. 19-003	Lint Free Cotton Cloth (Ref. 20-31-00)
	Referenced Procedures	
	- 71-13-00, P. Block 301	Cowl Doors
	- 36-11-00, P. Block 501	Engine Bleed Air Supply System

R 2. Procedure (Ref. Fig. 401)

A. Job Set-Up

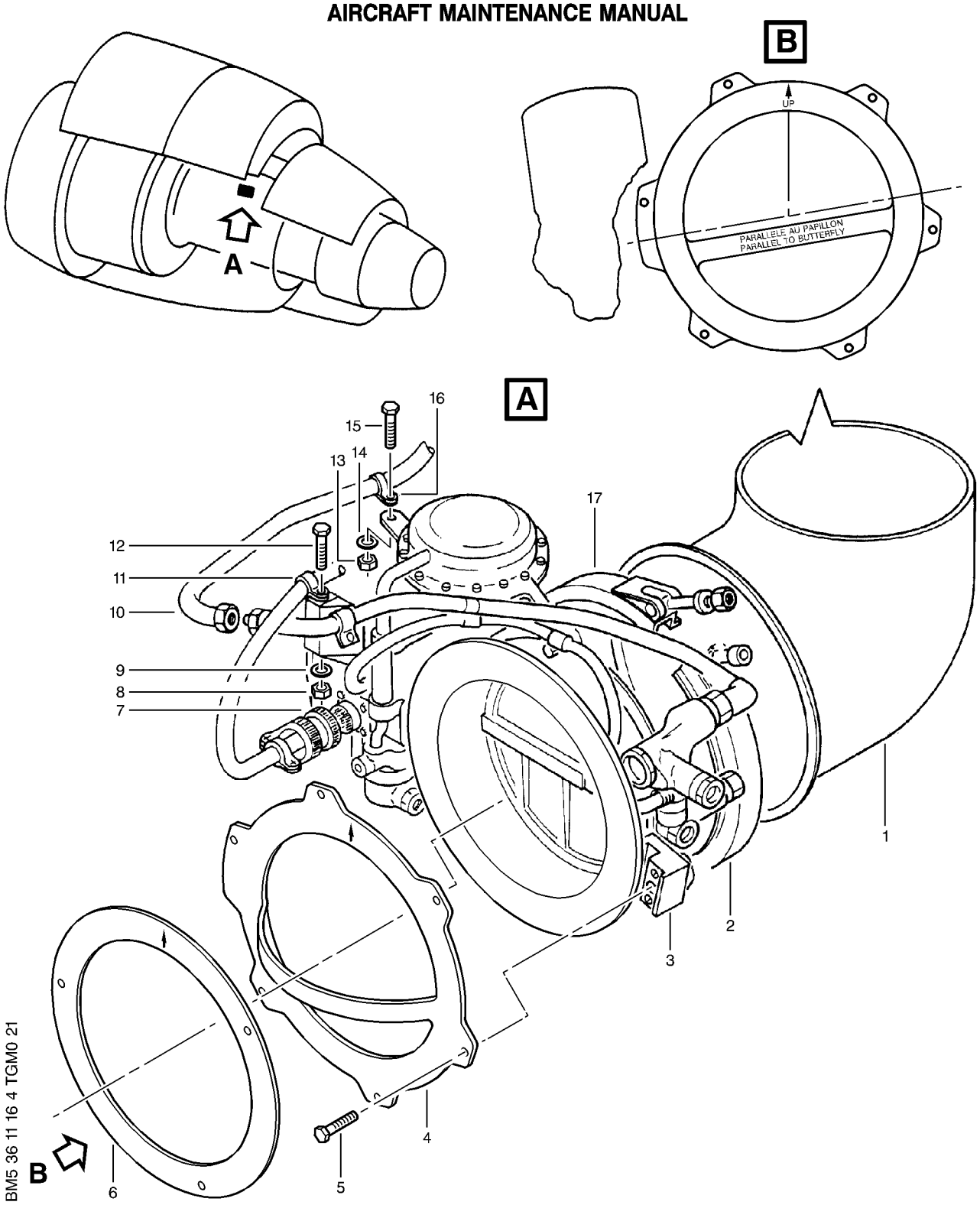
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/MONITOR	6HA	315/D54

(2)Open the left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(3)Position access platform.

B. Removal

R (1)Cut and remove lockwire and disconnect electrical connector (7).
R (2)Disconnect sense line (10).
R (3)Remove nut (8), washer (9) and bolt (12) from clamp (11) holding electrical cable.
R (4)Remove nut (13), washer (14) and bolt (15) from clamp (16) holding sense line (10).
R (5)Remove clamp (17) and valve (2).



Fan Air Valve
Figure 401

R

(6)Cap open ends of duct (1).
R (7)Cap open ends of sense line (10) and electrical connector (7).
R (8)Remove screws (5), flange assies (3) and remove vortex generator (4) from valve (2).
R (9)Remove O-ring (6) from vortex generator (4).

C. Preparation of Replacement Component
R WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, TOXIC. THEY SHOULD BE
R USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF
R VAPORS AND REPEATED OR PROLONGED CONTACT WITH THE SKIN, OR
R CLOTHING.
R (1)Clean and degrease the contact surface of the vortex generator with a
R lint free cotton cloth (Material No. 19-003) made moist with cleaning
R agents (Material No. 11-002).
R (2)Check for correct condition of vortex generator (4), replace it, if
R necessary.
R (3)Apply a thin layer of sealant (Material No. 09-018) to contact surface
R between vortex generator (4) and O-ring (6).
R (4)Put new O-ring (6) in position on vortex generator (4).
R (5)Install vortex generator (4) on valve (2) using flange assies (3),
R without tightening screws (5) at this stage. Orientate vortex generator to the position where its centerline is parallel to the valve butterfly
R centerline and the "UP" arrow is directed upward. Tighten screws (5).

D. Installation
(1)Clean and inspect precooler inlet duct for crack, wear, correct installation on thrust reverser cowl door and valve interface and/or adjacent area on engine.
(2)Remove blanking plugs/caps from duct (1) and from electrical connector
R (7) and sense line (10).
R (3)Install valve (2) on duct (1) ; install clamp (17) ; do not fully tighten at this stage.
(4)Rotate valve so that indexes on valve (2) and duct (1) are aligned to
R enable correct connection of sense line (10) and electrical connector
R (7) and to obtain clearance between valve and pylon, and valve and engine.
R (5)Tighten nut of clamp (17) and TORQUE to the value given on clamp.
NOTE : Using a mallet, lightly tap on and around top surface of clamp (17) and TORQUE again to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).
R (6)Connect sense line (10).
R (7)Connect electrical connector (7) and wirelock.
R (8)Make certain that sense line (10) is in correct position and install
R clamp (16) on valve (2) with bolt (15), washer (14) and nut (13).
(9)Make certain that electrical cable is in correct position and install
R clamp (11) on valve (2) with bolt (12), washer (9) and nut (8).

E. Test
(1)Perform BITE test (Ref. 36-11-00, P. BLock 501).

F. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close engine cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 5HA, 6HA, 7HA and 8HA.
(5)Remove warning notices.

FAN AIR VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF APPROPRIATE ENGINE
. PRESSURIZATION OF PNEUMATIC SYSTEM.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform (8 ft.)
B.	Torque Wrench 0 to 0.9 m.daN (0 to 80 lbf.in.)
C.	Circuit Breaker Safety Clips
D.	Lockwire Dia. 0.5 mm (0.02 in.)
E.	Warning Notices
F.	Blanking Plugs/Caps
G.98A36103501000	Positioning Tool - Fan Air Valve
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-00, P. Block 501	Engine Bleed Air Supply System
- 36-11-16, P. Block 601	Fan Air Valve

2. Procedure
(Ref. Fig. 401)

**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

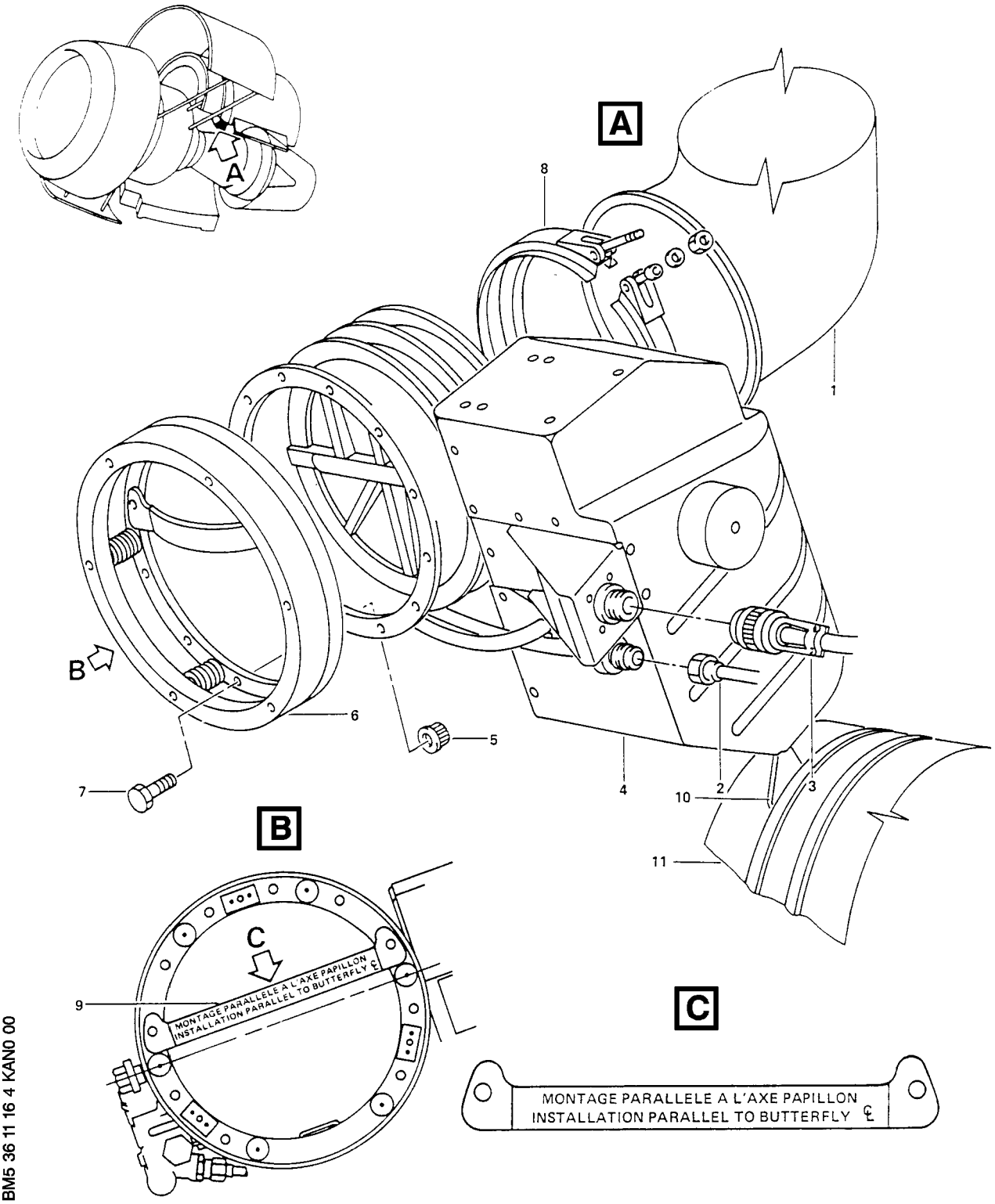
(Ref. Fig. 402)

**ON A/C 101-200,

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/MONITOR	6HA	315/D54

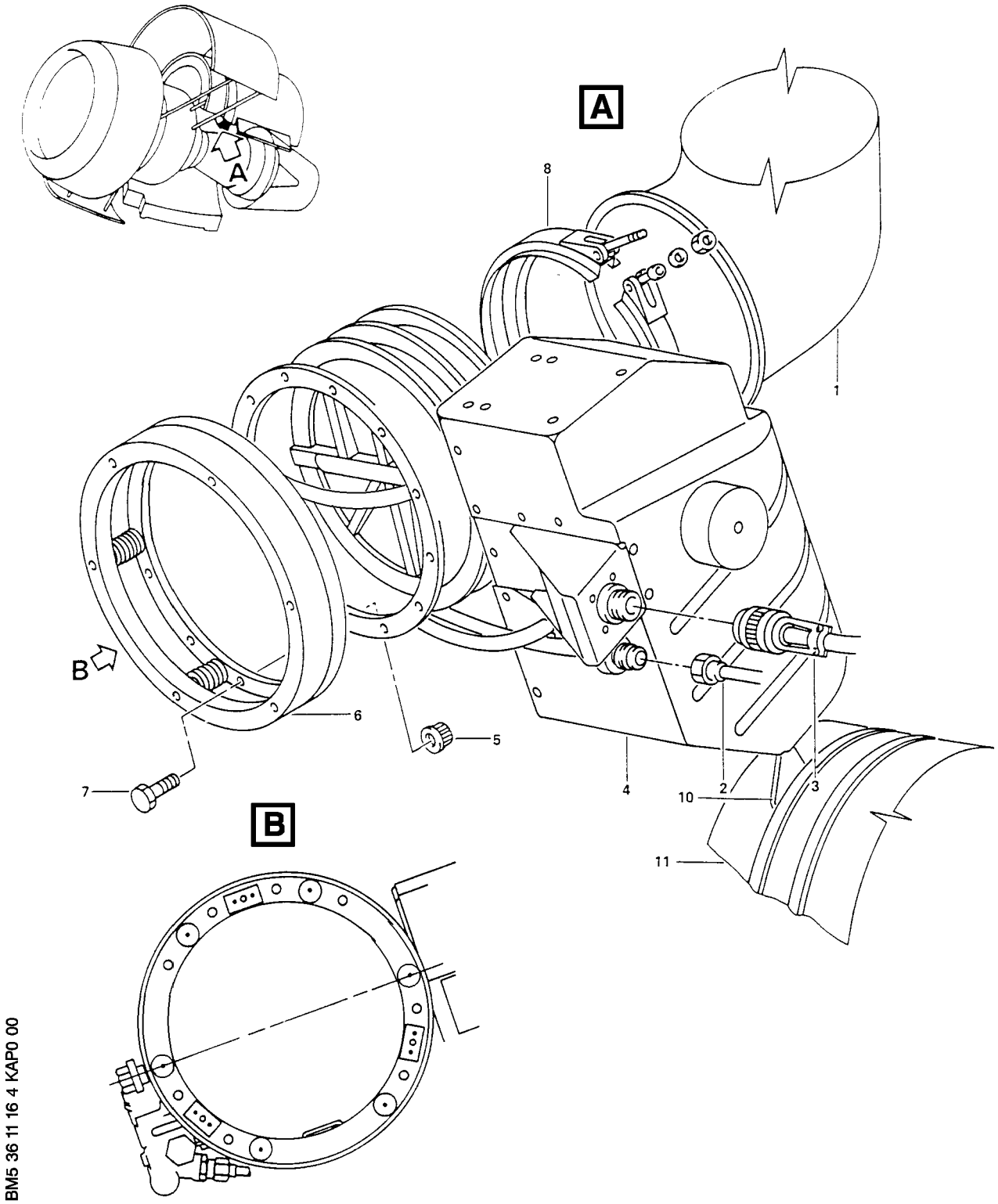
(2)Open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(3)Position access platform.



BM5 36 11 16 4 KAN0 00

Fan Air Valve
Figure 401

R



BM5 36 11 16 4 KAP0 00

Fan Air Valve
Figure 402

R

B. Removal
(1)Cut and remove lockwire and disconnect electrical connector (3).
(2)Disconnect sense line (2).
(3)Remove clamp (8) ; remove valve (4) equipped with spring-loaded seal assembly (6).
R (4)Install protective covers over open ends of duct (1), valve (4), electrical connector (3) and sense line (2).
(5)Remove nuts (5) and bolts (7) and remove spring-loaded seal assembly (6) from valve (4).

C. Preparation of Replacement Component
R (1)Check for correct condition of spring-loaded seal assembly (6) and vortex generator (9) ; replace if necessary.
R (2)Install spring-loaded seal assembly (6) on valve (4) with vortex generator (9) parallel to valve butterfly centerline and in valve upper half (Ref. Fig. 401). Install bolts (7) and nuts (5) ; TORQUE
R nuts to between 0.68 and 0.79 m.daN (60 and 70 lbf.in.).

D. Installation
(1)Clean and inspect precooler inlet duct for cracks, wear, correct installation on thrust reverser cowl door and valve interface and/or adjacent area on engine.
R (2)Remove protective covers from valve (4), duct (1), electrical connector (3) and sense line (2).
(3)Install valve (4) on duct (1) ; install clamp (8) but do not tighten at this stage.
(4)Install and hold positioning tool 98A36103501000 (10) on engine combustion chamber (11).
NOTE : Respect the installation direction shown on the tool (forward
R side).
(5)Turn valve (4) to have valve heatshield contact positioning tool (10) (Ref. Fig. 401).
R (6)Remove positioning tool (10).
R (7)Connect sense line (2).
R (8)Connect electrical connector (3) and tighten finger tight. Tighten plus
R one-eighth turn and lockwire.
R (9)Perform an inspection/check of the spring-loaded seal assembly compression (Ref. 36-11-16, P. Block 601).
R (10)Tighten nut of clamp (8) and TORQUE to the value given on clamp.
NOTE : Using a mallet, lightly tap on and around top surface of clamp (8) and TORQUE again to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).

**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

C. Preparation of Replacement Component

R (1)Check for correct condition of spring-loaded seal assembly (6) ; replace if necessary.
R (2)Install spring-loaded seal assembly (6) on valve (4) (Ref. Fig. 402).
R Install bolts (7) and nuts (5) ; TORQUE nuts to between 0.68 and
R 0.79 m. daN (60 and 70 lbf.in.).

D. Installation
(1)Clean and inspect precooler inlet duct for cracks, wear, correct installation on thrust reverser cowl door and valve interface and/or adjacent area on engine.
R (2)Remove protective covers from valve (4), duct (1), electrical connector (3) and sense line (2).
(3)Install valve (4) on duct (1) ; install clamp (8) but do not tighten at this stage.
(4)Install and hold positioning tool 98A36103501000 (10) on engine combustion chamber (11).
NOTE : Respect the installation direction shown on the tool (forward
R side).
(5)Turn valve (4) to have valve heatshield contact positioning tool (10) (Ref. Fig. 402).
R (6)Remove positioning tool (10).
R (7)Connect sense line (2).
R (8)Connect electrical connector (3) and tighten finger tight. Tighten plus
R one-eighth turn and lockwire.
R (9)Perform an inspection/check of the spring-loaded seal assembly compression (Ref. 36-11-16, P. Block 601).
R (10)Tighten nut of clamp (8) and TORQUE to the value given on clamp.
NOTE : Using a mallet, lightly tap on and around top surface of clamp (8) and TORQUE again to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN).

**ON A/C 101-200,

E. Test
Perform BITE test (Ref. 36-11-00, P. Block 501, Operational Test).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close engine cowl door (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 5HA, 6HA, 7HA and 8HA.
(5)Remove warning notices.

FAN AIR VALVE - ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- **DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING OPERATION OF PNEUMATIC SYSTEM.**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Functional Test

A. Equipment and Materials

ITEM	DESIGNATION
(1)290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
(2)	Access Platform 3.6 m (12 ft.)
(3)	Gasket
(4)	Lockwire Dia. 0.8 mm and 0.5 mm (0.031 and 0.019 in.)
(5)	Warning Notice
(6)290166	Adapter - Valve Test
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure

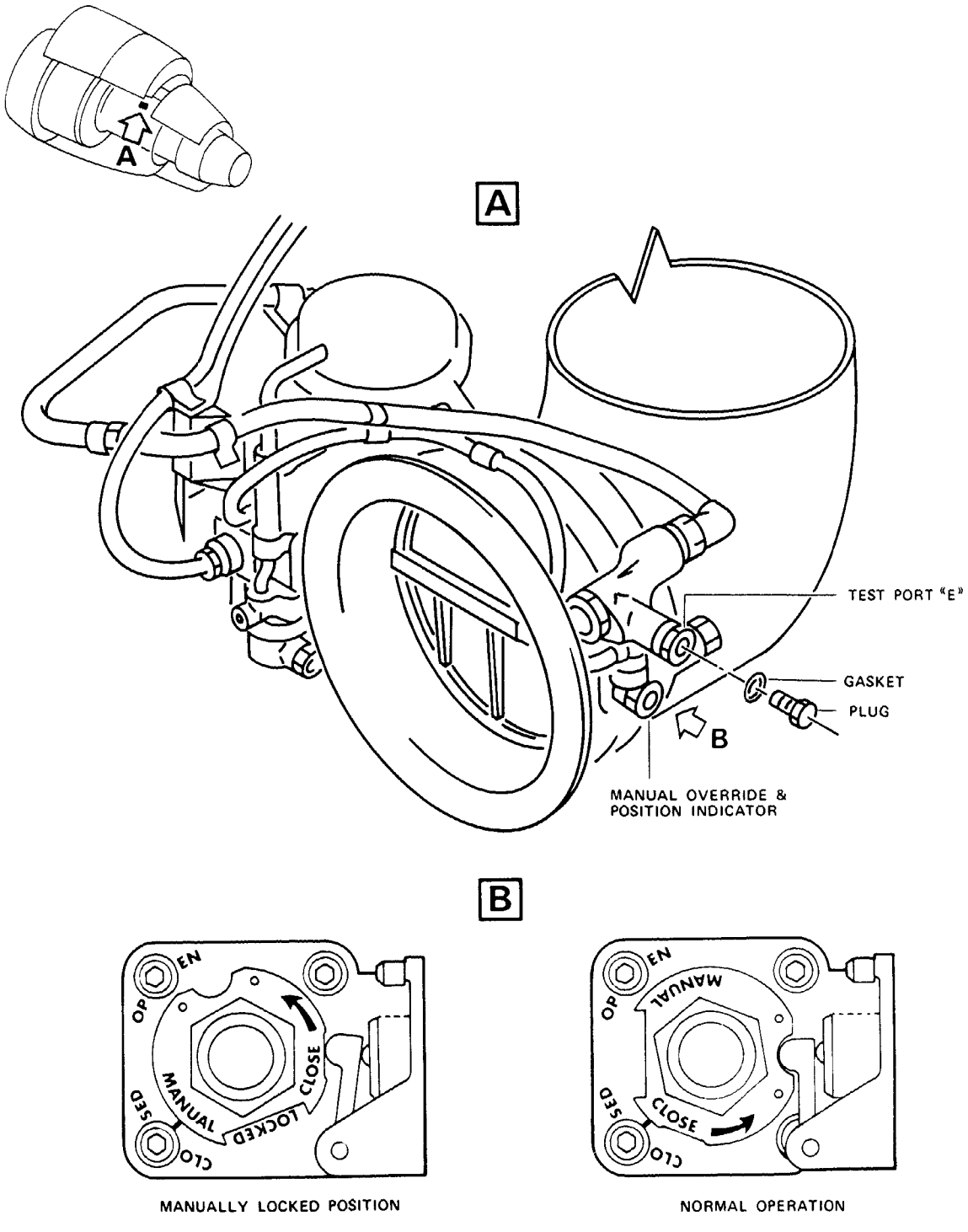
(1)Job set-up
- (a)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
- (b)Position access platform.
- (c)On fan air valve
  - cut and remove lockwire, remove plug from test port E.
  - install test set adapter X on test port E.
  - make certain that valve is not manually locked in closed position and that visual position indicator is in **CLOSED** position.
- (d)Make certain that all test set controls are in **OFF** position.
- (e)Connect test set outlet union No.1 to adapter X of test port E.

(2)Test
(Ref. Fig. 501)
(Ref. Fig. 502)

ACTION	RESULT
1. On test set - place **SYSTEM SELECTOR** in **B** position - open cylinder shutoff valve - slowly increase pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while checking valve position indicator	- valve opens and is fully open when pressure reaches 20 psi (visual position indicator in **OPEN** position).

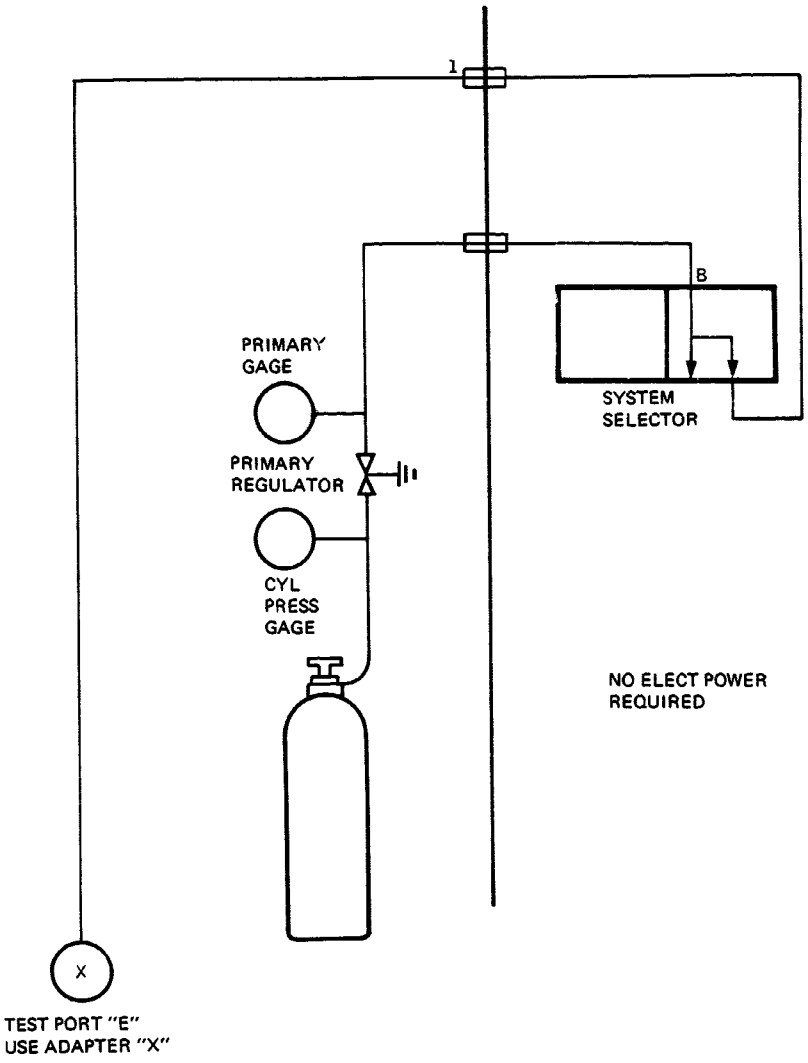
ACTION	RESULT
2. On fan air valve - cut and remove lockwire from manual override - rotate manual override to closing detent	- valve closes and visual position indicator moves to **CLOSED** position.
3. On fan air valve - rotate manual override to opening detent	- valve opens and visual position indicator moves to **OPEN** position.
4. On test set - slowly increase pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while aurally checking for correct operation of relief valve	- relief valve operates when pressure ranges between 163 and 190 psi.

(3)Close-up
- (a)On test set
  - close cylinder shutoff valve.
  - shut down pressure until **PRIMARY GAGE** reads zero.
  - place all controls in **OFF** position.
- (b)Disconnect test set.
- (c)On fan air valve
  - remove adapter X from test port.
  - check for correct condition of gasket, replace if necessary, install gasket, install plug on test port E and wirelock.
  - make certain that manual override is in normal operating position and wirelock.
- (d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (e)Remove access platform.
- (f)Close engine cowls doors (Ref. 71-13-00, P. Block 301).
- (g)Remove warning notices.



BM5 36 11 16 5 TGMO·13

Fan Air Valve - Test Port
Figure 501



BM5 36 11 16 5 ACMO

Test Set - Connection Diagram
Figure 502

FAN AIR VALVE - ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING OPERATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Functional Test

A. Equipment and Materials

ITEM	DESIGNATION
(1)290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
(2)	Access Platform 3.6 m (12 ft.)
(3)	Gasket
(4)	Lockwire Dia. 0.8 mm and 0.5 mm (0.031 and 0.019 in.)
(5)	Warning Notice
(6)290166	Adapter - Valve Test
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure

(1)Job set-up

(a)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).

(b)Position access platform.

(c)On fan air valve

- cut and remove lockwire, remove plug from test port E.
- install test set adapter X on test port E.
- make certain that valve is not manually locked in closed position and that visual position indicator is in CLOSED position.

(d)Make certain that all test set controls are in OFF position.

(e)Connect test set outlet union No.1 to adapter X of test port E.

(2)Test

(Ref. Fig. 501)

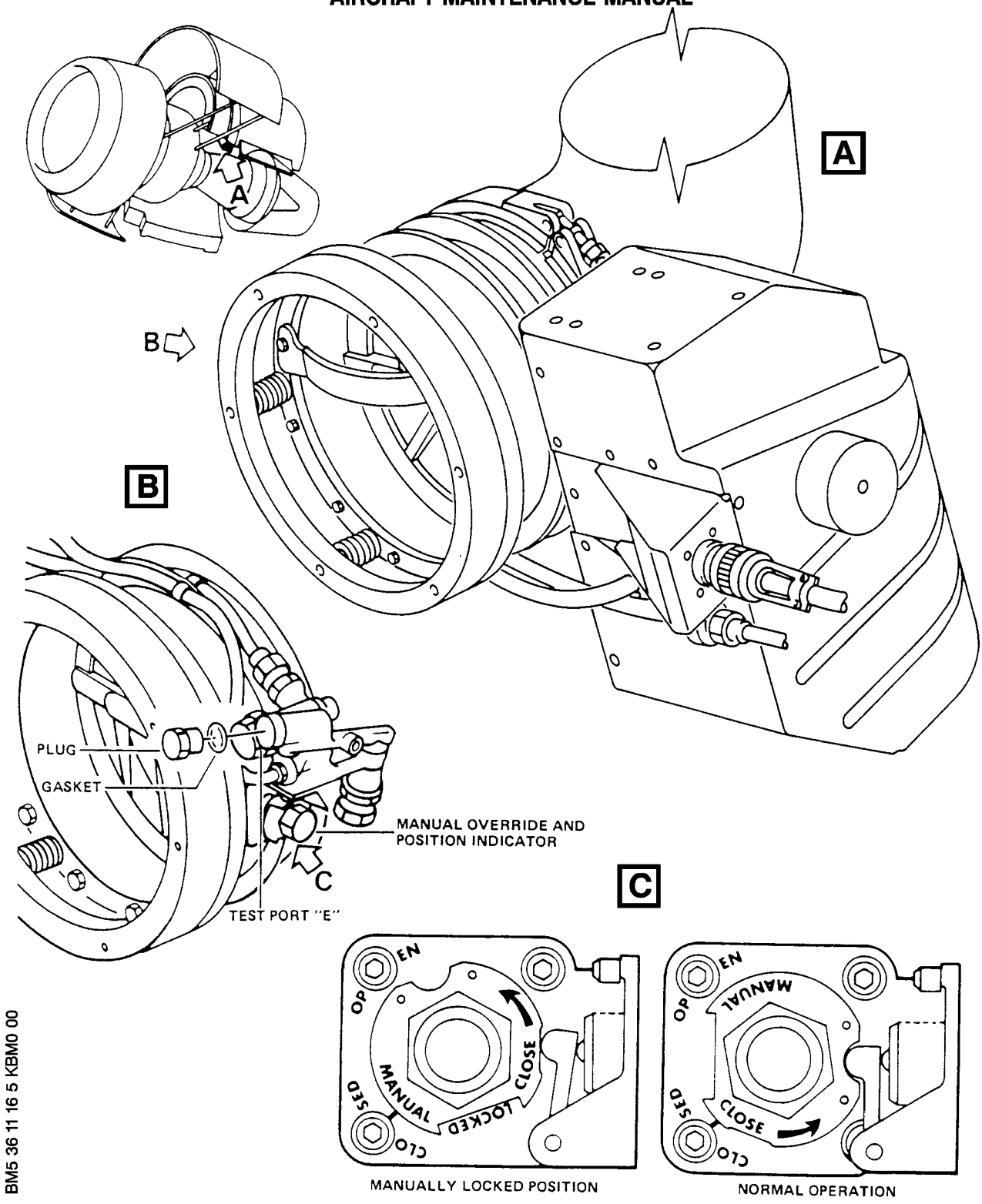
**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

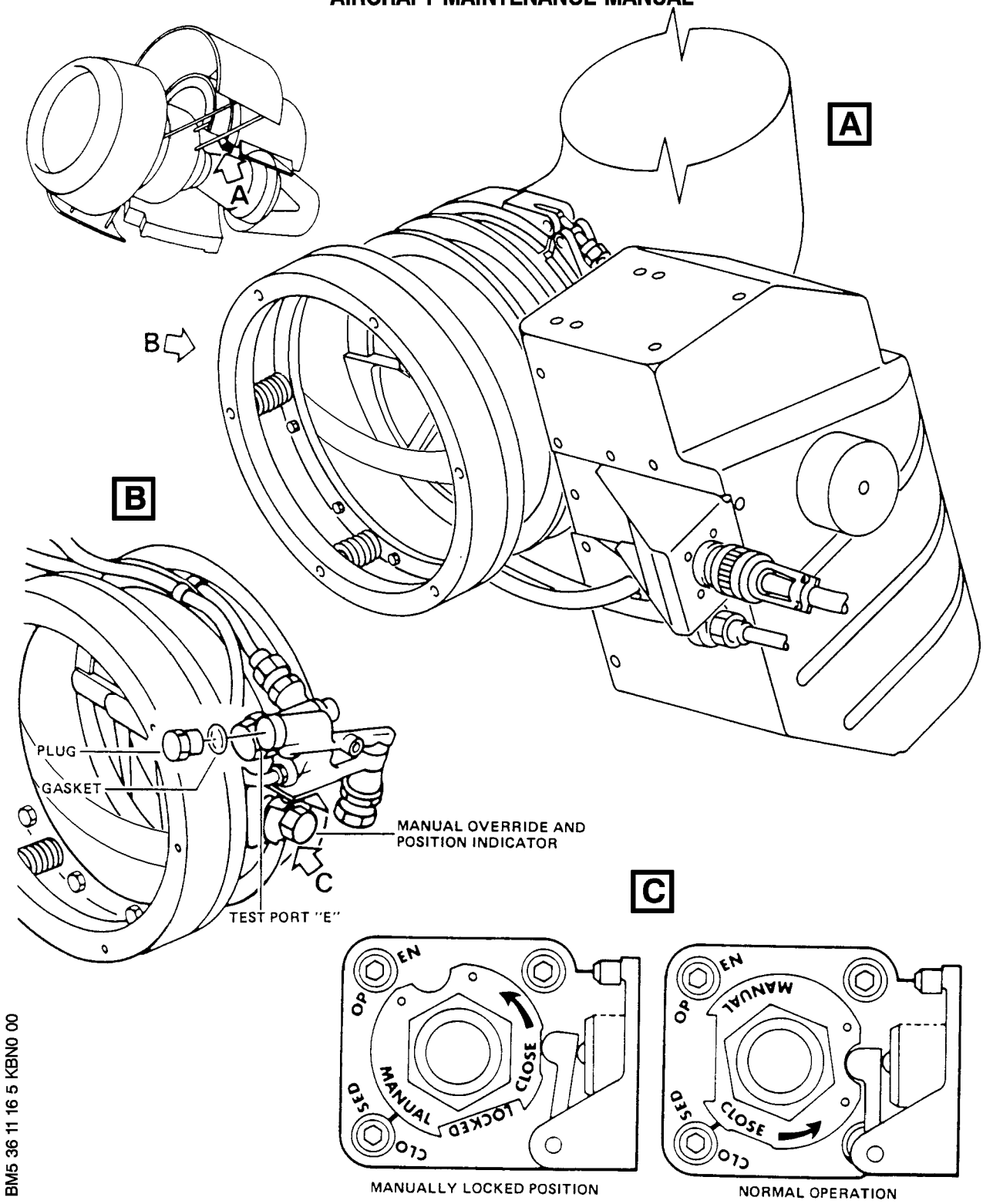
(Ref. Fig. 502)

**ON A/C 101-200,

(Ref. Fig. 503)

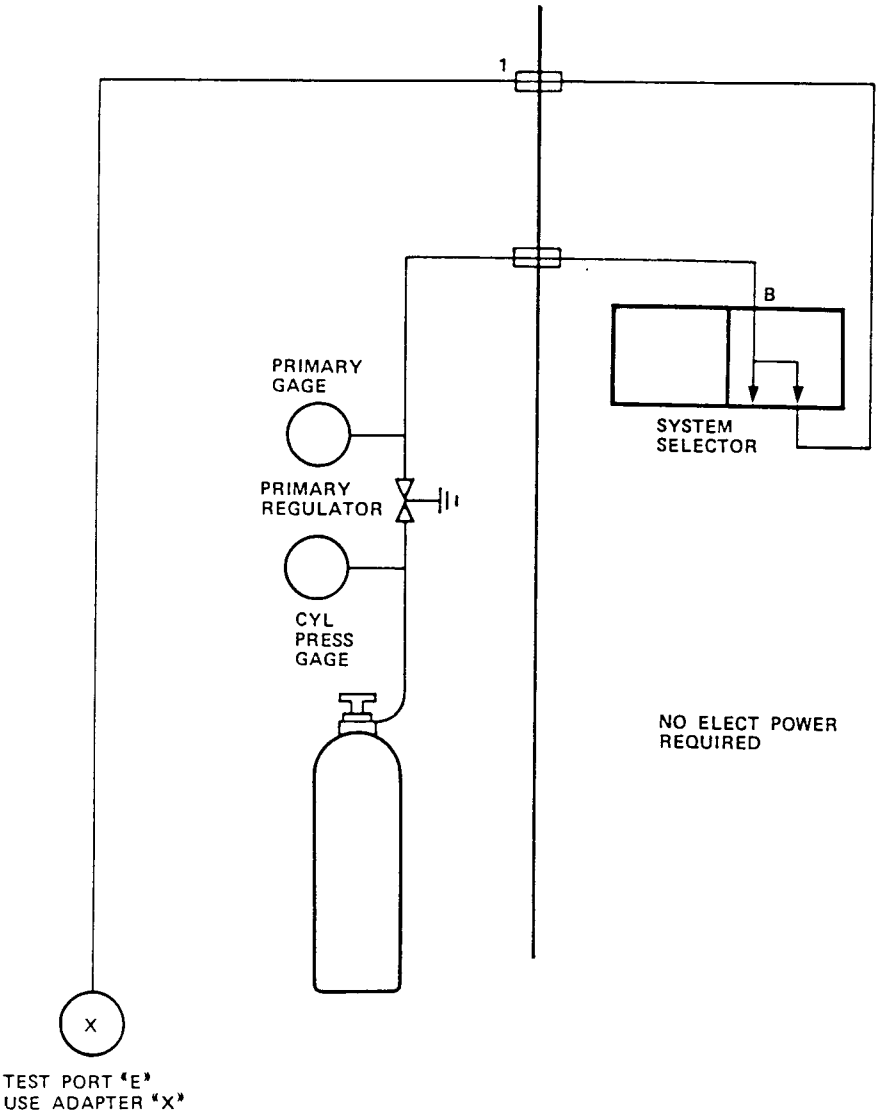


Fan Air Valve - Test Port
Figure 501



Fan Air Valve - Test Port
Figure 502

R



BM5 36 11 16 5 KCM0 00

Test Set - Connection Diagram
Figure 503

ACTION	RESULT
1. On test set - place **SYSTEM SELECTOR** in **B** position - open cylinder shutoff valve - slowly increase pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while checking valve position indicator	- valve opens and is fully open when pressure reaches 20 psi (visual position indicator in **OPEN** position).
2. On fan air valve - cut and remove lockwire from manual override - rotate manual override to closing detent	- valve closes and visual position indicator moves to **CLOSED** position.
3. On fan air valve - rotate manual override to opening detent	- valve opens and visual position indicator moves to **OPEN** position.
4. On test set - slowly increase pressure on **PRIMARY GAGE** by means of **PRIMARY REGULATOR** while aurally checking for correct operation of relief valve	- relief valve operates when pressure ranges between 163 and 190 psi.

(3)Close-up
- (a)On test set
  - close cylinder shutoff valve.
  - shut down pressure until **PRIMARY GAGE** reads zero.
  - place all controls in **OFF** position.
- (b)Disconnect test set.
- (c)On fan air valve
  - remove adapter X from test port.
  - check for correct condition of gasket, replace if necessary, install gasket, install plug on test port E and wirelock.
  - make certain that manual override is in normal operating position and wirelock.
- (d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
- (e)Remove access platform.
- (f)Close engine cowls doors (Ref. 71-13-00, P. Block 301).
- (g)Remove warning notices.

FAN AIR VALVE - INSPECTION/CHECK

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF APPROPRIATE ENGINE
. PRESSURIZATION OF PNEUMATIC SYSTEM.

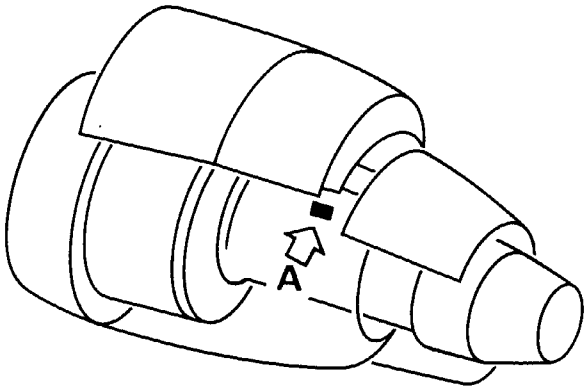
1. Fan Air Valve Filter

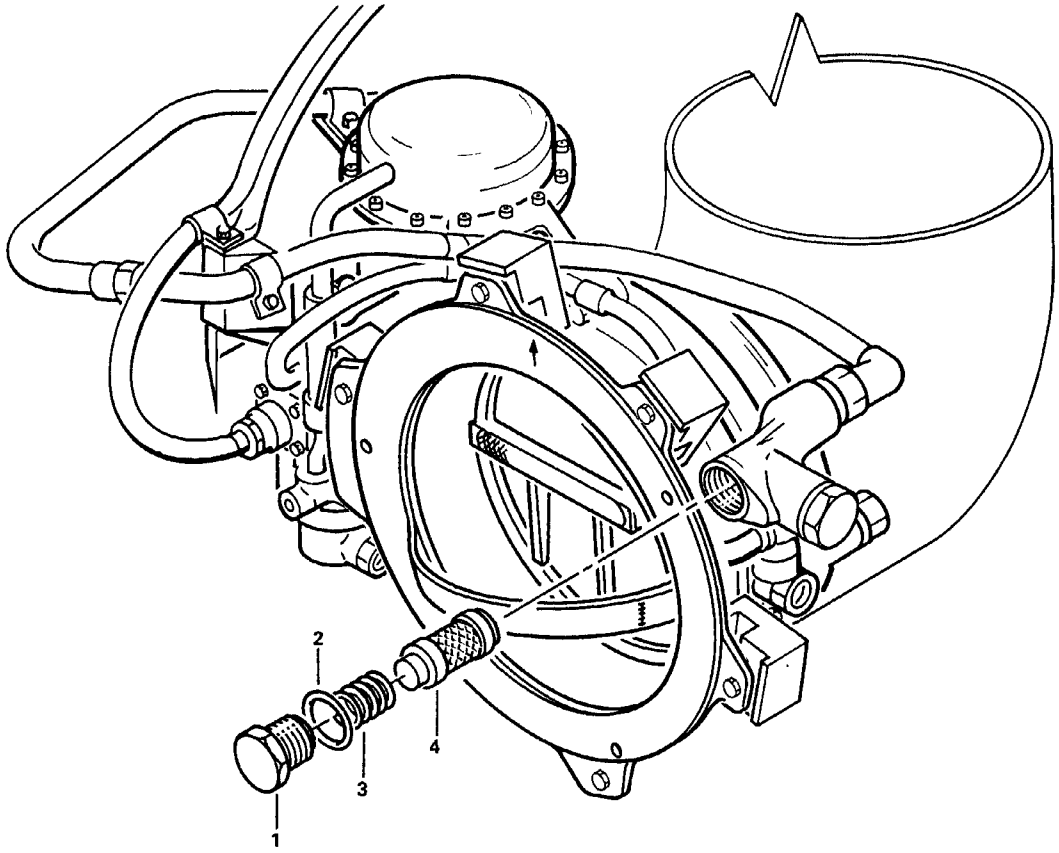
A. Reason for the Job
Check for correct condition of filter.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.5 m (8 ft.)
(2)	Corrosion - Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
(3)	Gasket
(4)	Blanking Plugs/Caps
(5)	Warning Notices
(6)Material No. 11-002	Cleaning Agent (Ref. 20-31-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(Ref. Fig. 601)
(1)Job set-up
(a)Open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(2)Inspection/check
(a)Cut and remove lockwire, remove plug (1), gasket (2), spring (3) and filter (4). Discard gasket.
(b)Blank off filter orifice on valve.
R (c)Clean filter with cleaning agent (Material No. 11-002) or send it in
R overhaul facility for ultrasonic method.
(d)Check filter for corrosion, clogging or damage. Replace if necessary.
(e)Remove blanking cap and install gasket (2) on plug (1), install filter (4), spring (3) and plug (1) and wirelock.
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(d)Remove warning notices.





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Fan Air Valve Filter
Figure 601

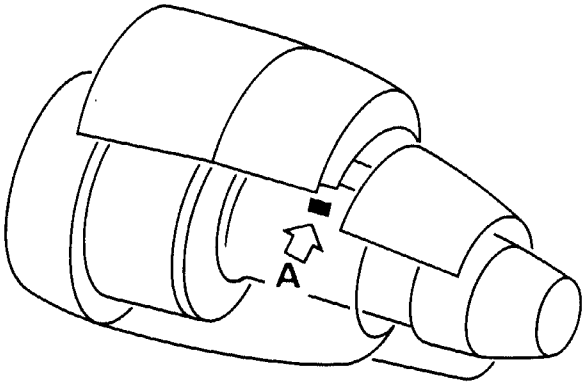
2. Vortex Generator Assembly of the Fan Air Valve

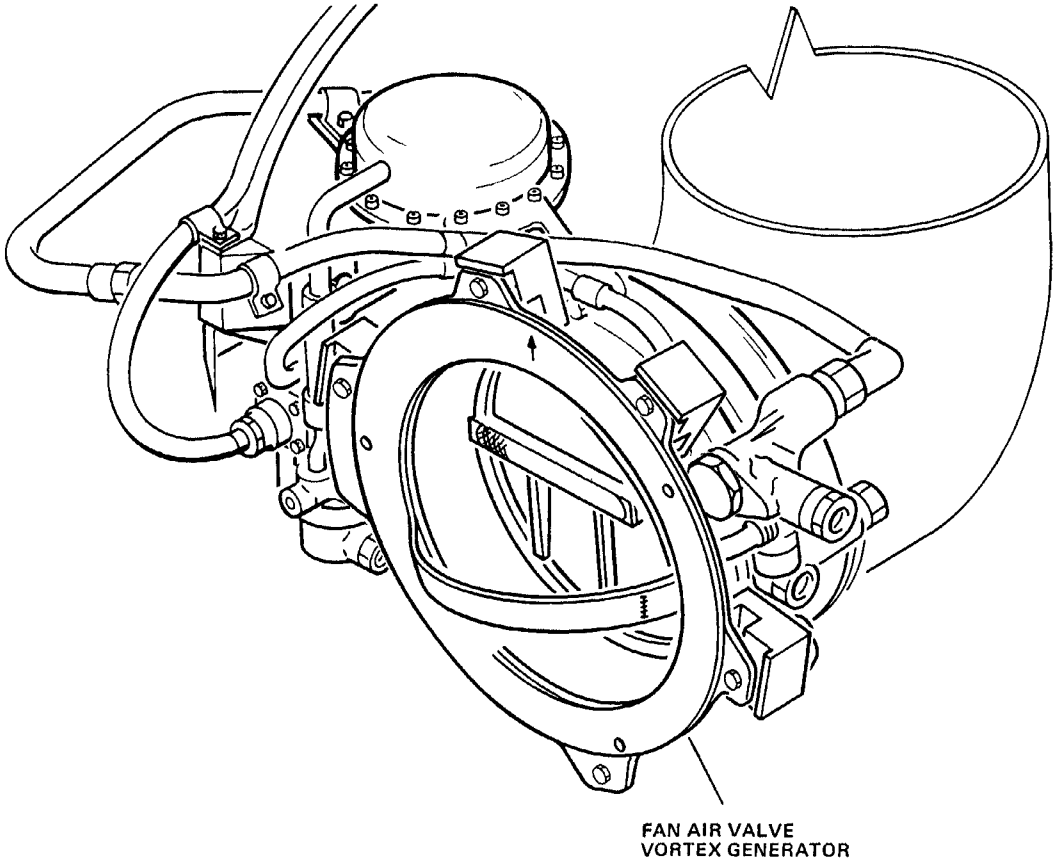
A. Reason for the Job
Visual inspection of the fan air valve vortex generator.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(Ref. Fig. 602)
(1)Job set-up
(a)Open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(2)Inspection/check
(a)Perform a detailed visual inspection of the fan air valve vortex generator for integrity and absence of cracks.
(b)If crack/damage is found, replace the vortex generator.
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).





BM5 36 11 16 6 GEMO - 00

Fan Air Valve Vortex Generator Assembly
Figure 602

FAN AIR VALVE - INSPECTION/CHECK

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. START UP OF APPROPRIATE ENGINE
. PRESSURIZATION OF PNEUMATIC SYSTEM.

1. Fan Air Valve Filter

A. Reason for the Job
Check for correct condition of filter.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform 2.5 m (8 ft.)
(2)	Corrosion - Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
(3)	Gasket
(4)	Blanking Plugs/Caps
(5)	Warning Notices
(6)Material No. 11-002	Cleaning Agent (Ref. 20-31-00)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors
- 78-36-10, P. Block 401	Duct - Precooler Supply

C. Procedure
(Ref. Fig. 601)

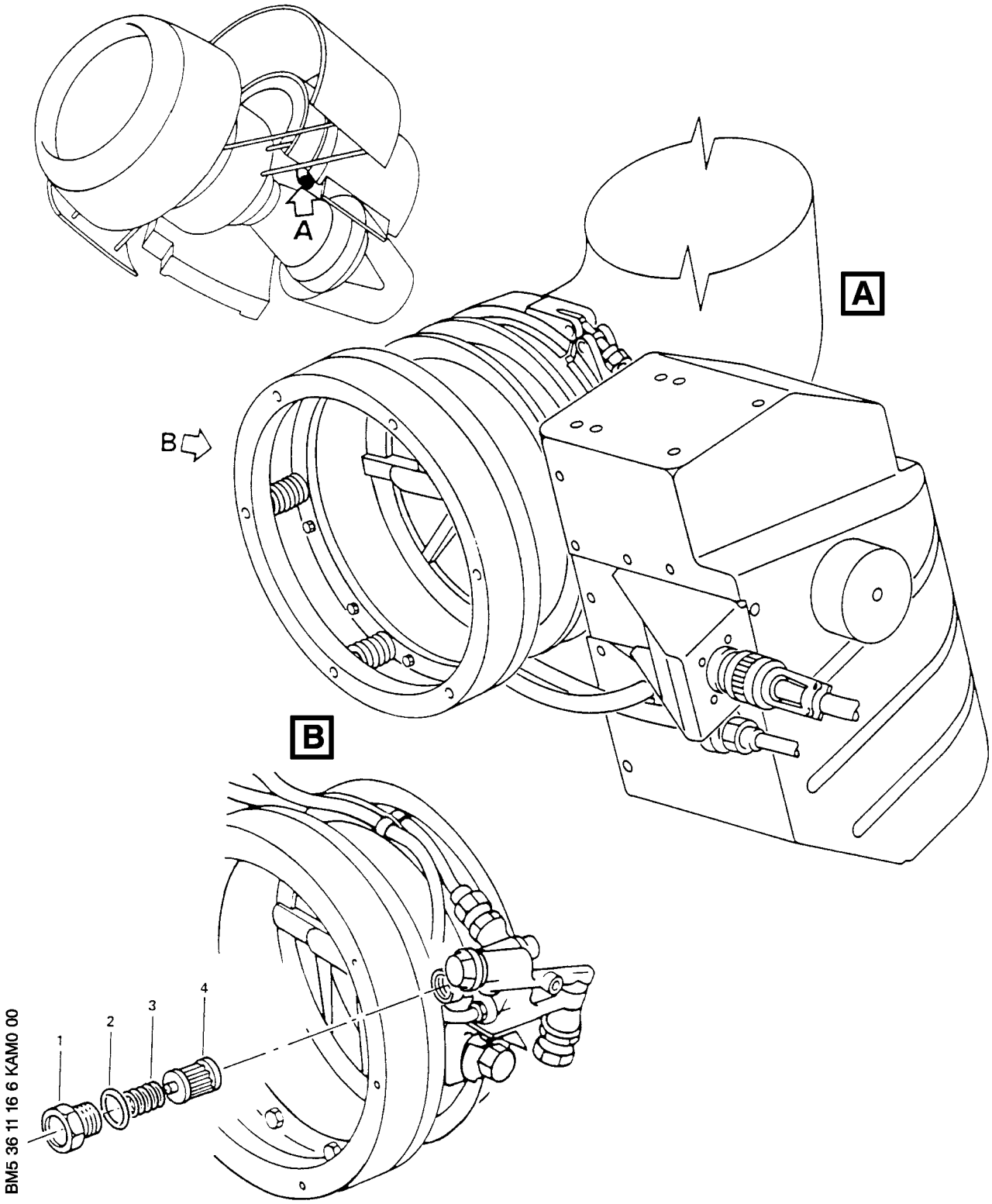
**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

(Ref. Fig. 602)

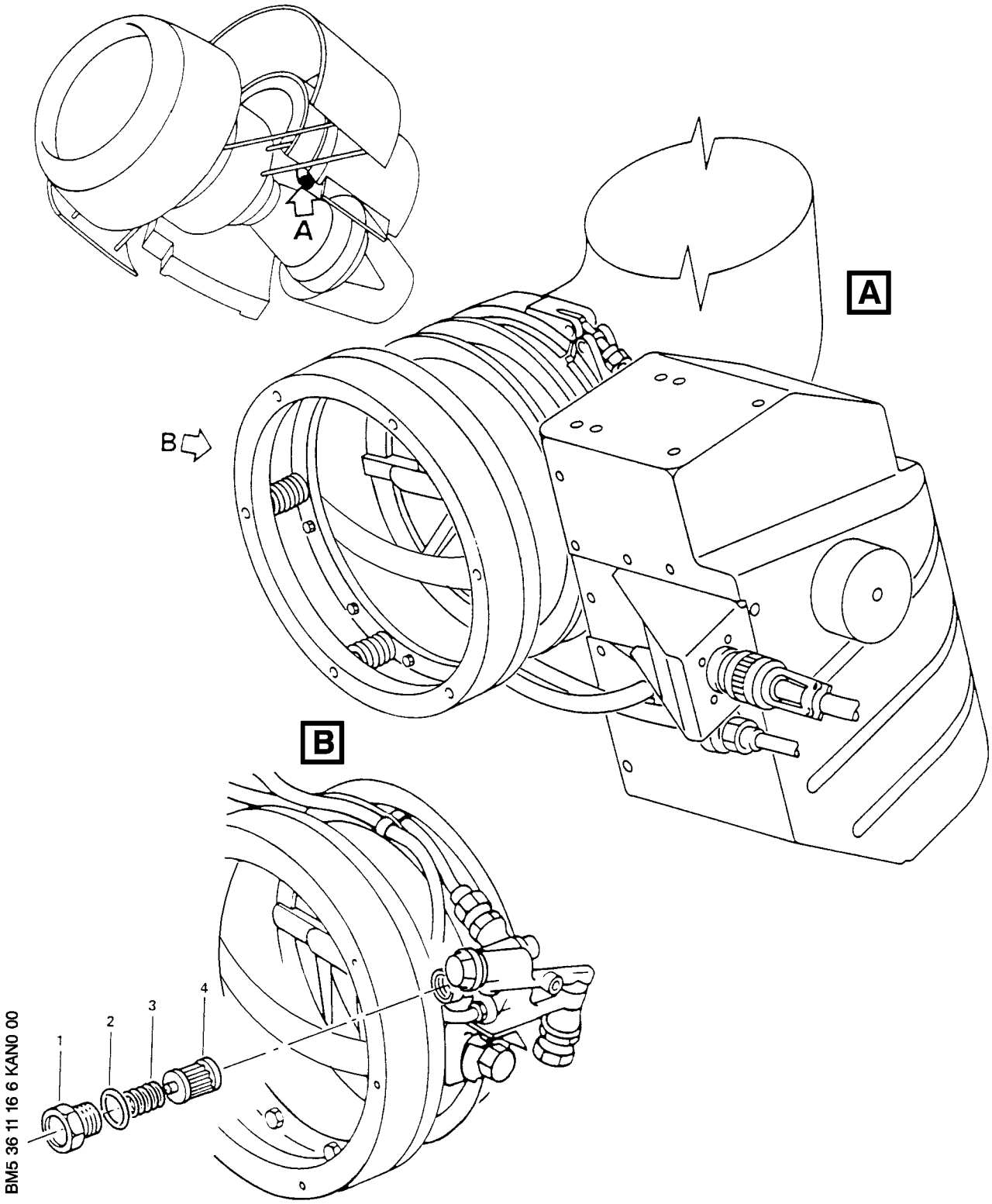
**ON A/C 101-200,

(1)Job set-up
(a)Open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(2)Inspection/check
(a)Cut and remove lockwire, remove plug (1), gasket (2), spring (3) and filter (4). Discard gasket.
(b)Blank off filter orifice on valve.
R (c)Clean filter with cleaning agent (Material No. 11-002) or send it in
R overhaul facility for ultrasonic method.
(d)Check filter for corrosion, clogging or damage. Replace if necessary.
(e)Remove blanking cap and install gasket (2) on plug (1), install filter (4), spring (3) and plug (1) and wirelock.



Fan Air Valve Filter
Figure 601

R



Fan Air Valve Filter
Figure 602

R

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(d)Remove warning notices.

2. Fan Air Valve Spring-Loaded Seal Assembly (Kiss Seal)

A. Reason for the Job
Check correct compression of spring-loaded seal assembly.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform
(2)	Warning Notice
(3)	Modelling Clay
Referenced Procedures	
71-13-00, P. Block 301	Cowl Doors
78-36-10, P. Block 401	Precooler Supply Duct

C. Procedure
(Ref. Fig. 603)

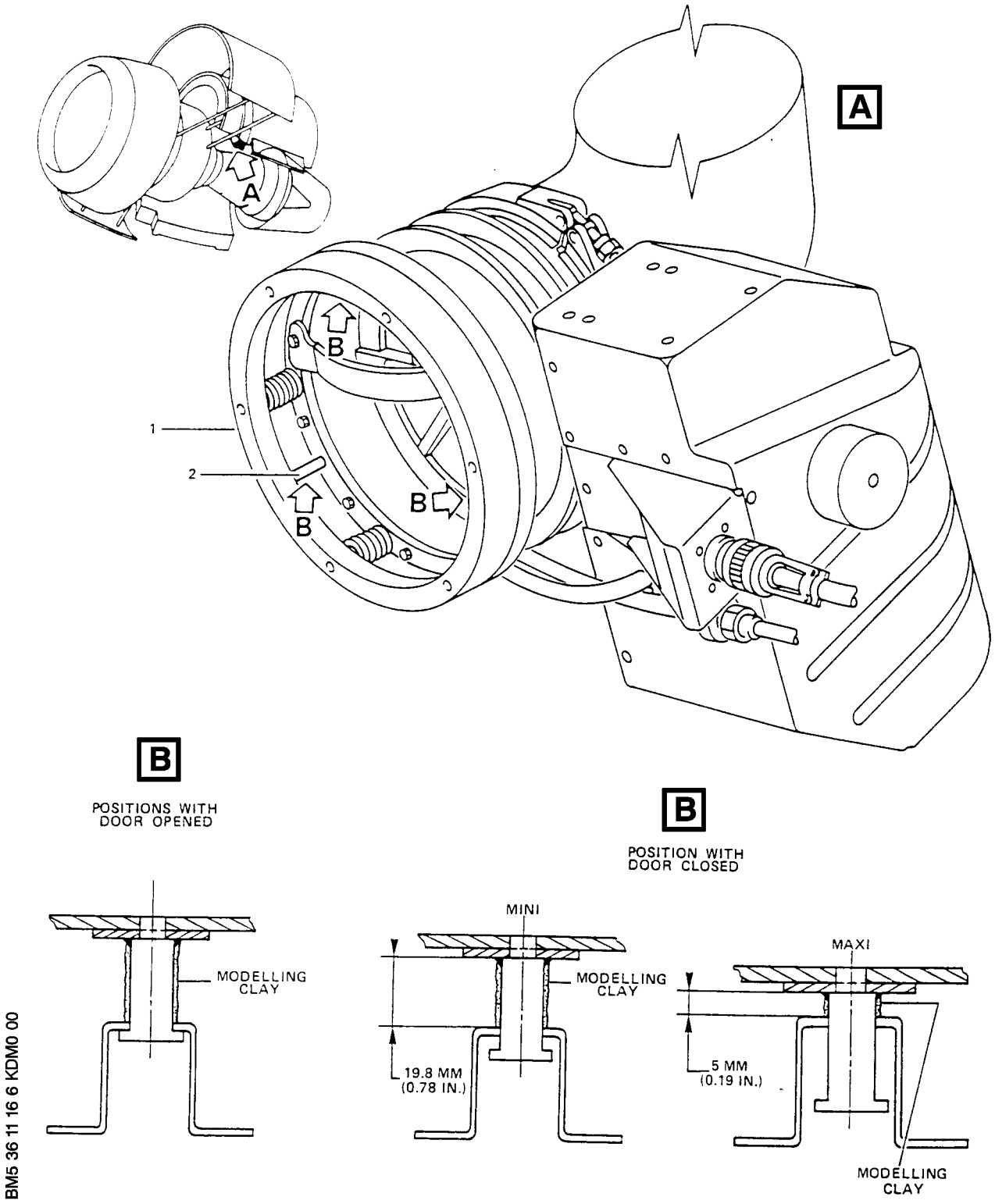
**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

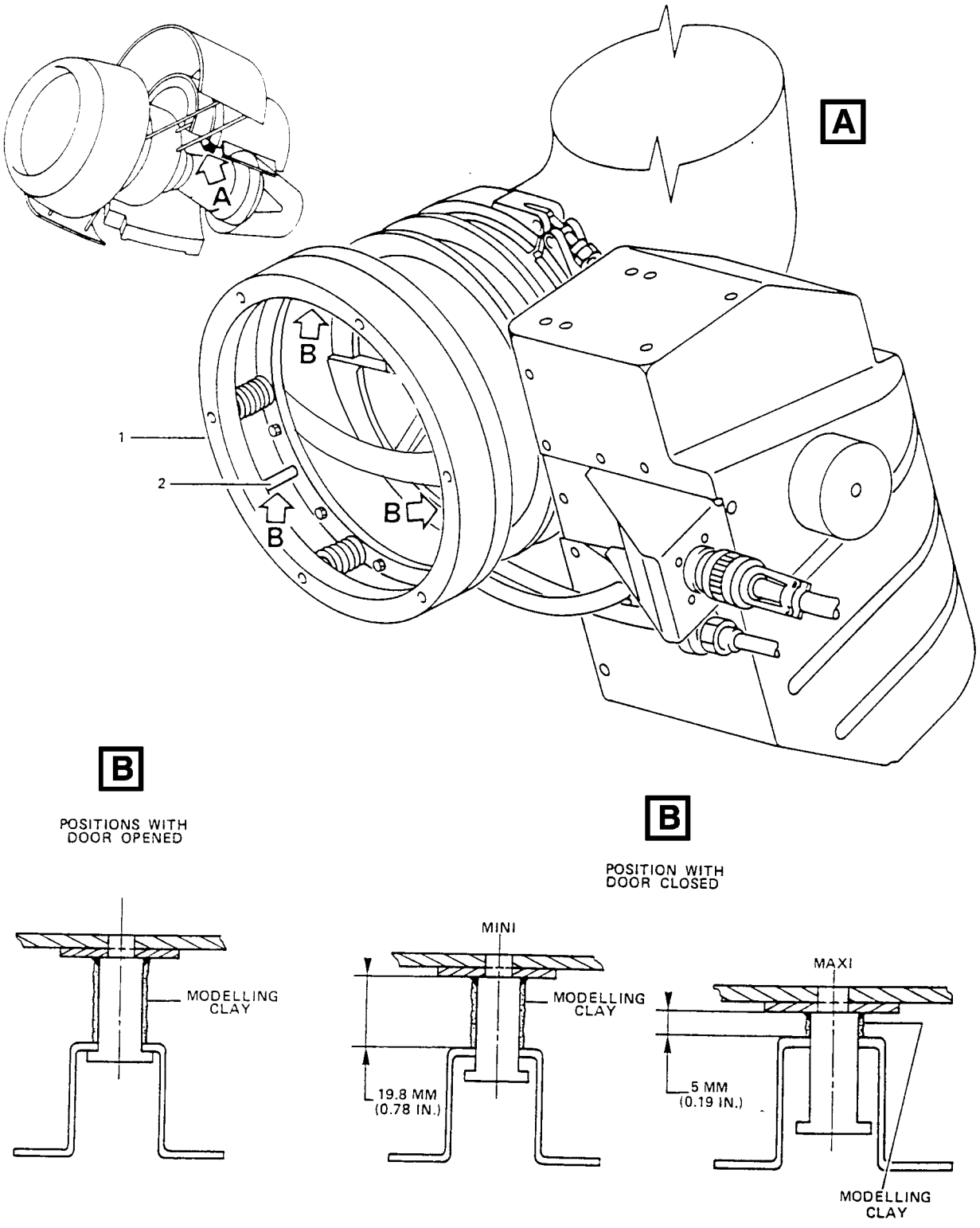
(Ref. Fig. 604)

**ON A/C 101-200,

(1)Job set-up
(a)Open left thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(b)Position access platform.
(2)Inspection/check
(a)Apply modelling clay along the three guide pins (2) of seal assembly (1).
(b)Temporarily close left thrust reverser cowl door, then reopen it (Ref. 71-13-00, P. Block 301).
(c)Measure the gap shown by the modelling clay left on the guide pins (2).
1 If the dimension is less than 5 mm (0.19 in.) or more than 19.8 mm (0.78 in.), readjust the position of the precooler supply duct (Ref. 78-36-10, P. Block 401).
2 If the dimension is between 5 mm (0.19 in.) and 19.8 mm (0.78 in.) remove the modelling clay from guide pins (2).
(3)Close-up



Fan Air Valve Seal Assembly Compression
Figure 603



Fan Air Valve Seal Assembly Compression
Figure 604

R

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close thrust reverser cowl door (Ref. 71-13-00, P. Block 301).
(d)Remove warning notice.

FAN AIR VALVE - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Item

CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY A WARNING NOTICE ON THE HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Deactivation

A. Reason for the Job

To permit dispatch of the aircraft with one fan air valve inoperative, provided that this fan air valve is secured in closed position.

B. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 2.5 m (8 ft.)
2.	Warning Notices
3.	Circuit Breaker Safety Clips
4.	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

C. Procedure

(Ref. Fig. 901)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68

(b)On AIR BLEED panel 436VU
- Release ENG 1 (ENG 2) BLEED VALVE pushbutton switch. OFF legend comes on.

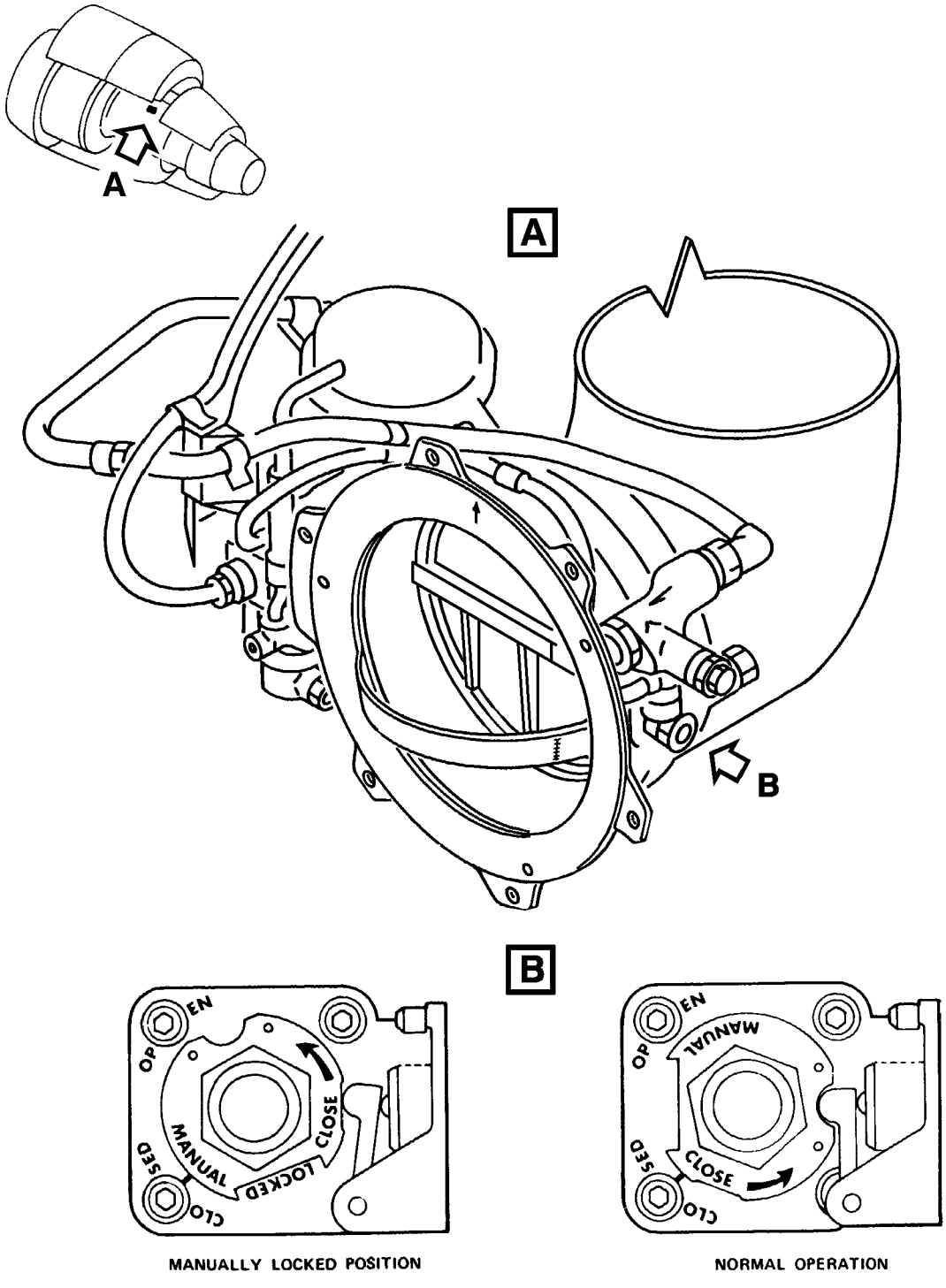
(c)Position access platform.

(d)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).

(2)Deactivation

(a)Disconnect electrical connector (1).

R (b)Remove lockwire and move fan air valve 51 HA (52 HA) manually to CLOSED
R position. Secure manual override with lockwire.



MANUALLY LOCKED POSITION

NORMAL OPERATION

BM5 36 11 16 9 LAM0 00

Fan Air Valve
Figure 901

(c)Connect electrical connector (1).
(d)On AIR BLEED panel 436VU
- Release X FEED mode pushbutton switch. MAN legend on X FEED pushbutton switch comes on and flowbar on X FEED valve position pushbutton switch is cross line.
- Press X FEED valve position pushbutton switch. Flowbar on X FEED valve position pushbutton switch is in line.

(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove warning notices.
(c)Close engine cowls (Ref. 71-13-00, P. Block 301).
(d)Remove access platform.
(e)Remove safety clips and tags and close circuit breakers.
R (f)Install temporary placard in flight compartment to warn flight crew
R that left (right) fan air valve is deactivated.
R (g)Make entry in aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 2.5 m (8 ft.)
2.	Circuit Breaker Safety Clips
R 3.	Corrosion Resistant Steel Lockwire Dia. 0.8 mm
R	(0.03 in.)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74

(b)Position access platform.
(c)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Reactivation
(a)Disconnect electrical connector (1).
(b)Remove lockwire and return manual override to normal operation position (clockwise).
R (c)Safety manual override with lockwire.

R (d)Connect electrical connector (1).

R (e)On **AIR BLEED** panel **436VU**

- Press **ENG 1 (ENG 2) BLEED VALVE** pushbutton switch. **OFF** legend goes off.
- Release **X FEED** valve position pushbutton switch. Flowbar is cross line.
- Press **X FEED** mode pushbutton switch. **MAN** legend goes off.

R (f)Troubleshoot the system (Ref. **TSM** Chapter **36-11**).

(3) Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Remove temporary placard.

(c)Clear technical log.

(d)Close engine cowls (Ref. **71-13-00, P. Block 301**).

(e)Remove access platform.

(f)Remove safety clips and tags and close circuit breakers **1KG, 1JH, 2JH, 1KM, 2KM**).

FAN AIR VALVE - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Item
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY A WARNING NOTICE ON THE HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Deactivation

A. Reason for the Job
To permit dispatch of the aircraft with one fan air valve inoperative, provided that this fan air valve is secured in closed position.

B. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 2.5 m (8 ft.)
2.	Warning Notices
3.	Circuit Breaker Safety Clips
4.	Corrosion Resistant Steel Lockwire Dia. 0.8 mm (0.032 in.)
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

C. Procedure
(Ref. Fig. 901)

R **ON A/C 105-200,

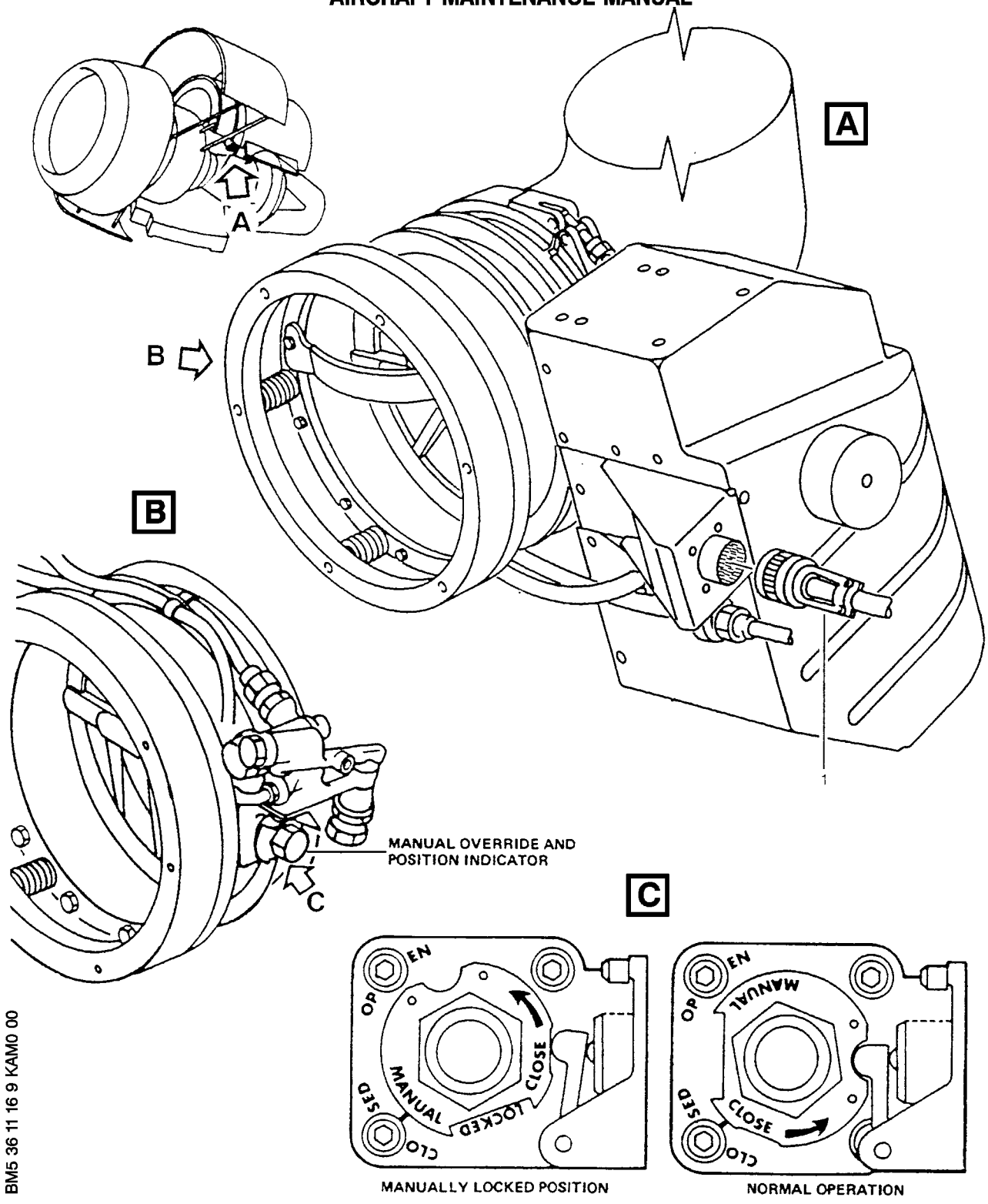
R Post SB 36-2029 For A/C 105-200,

R (Ref. Fig. 902)

R **ON A/C 101-200,

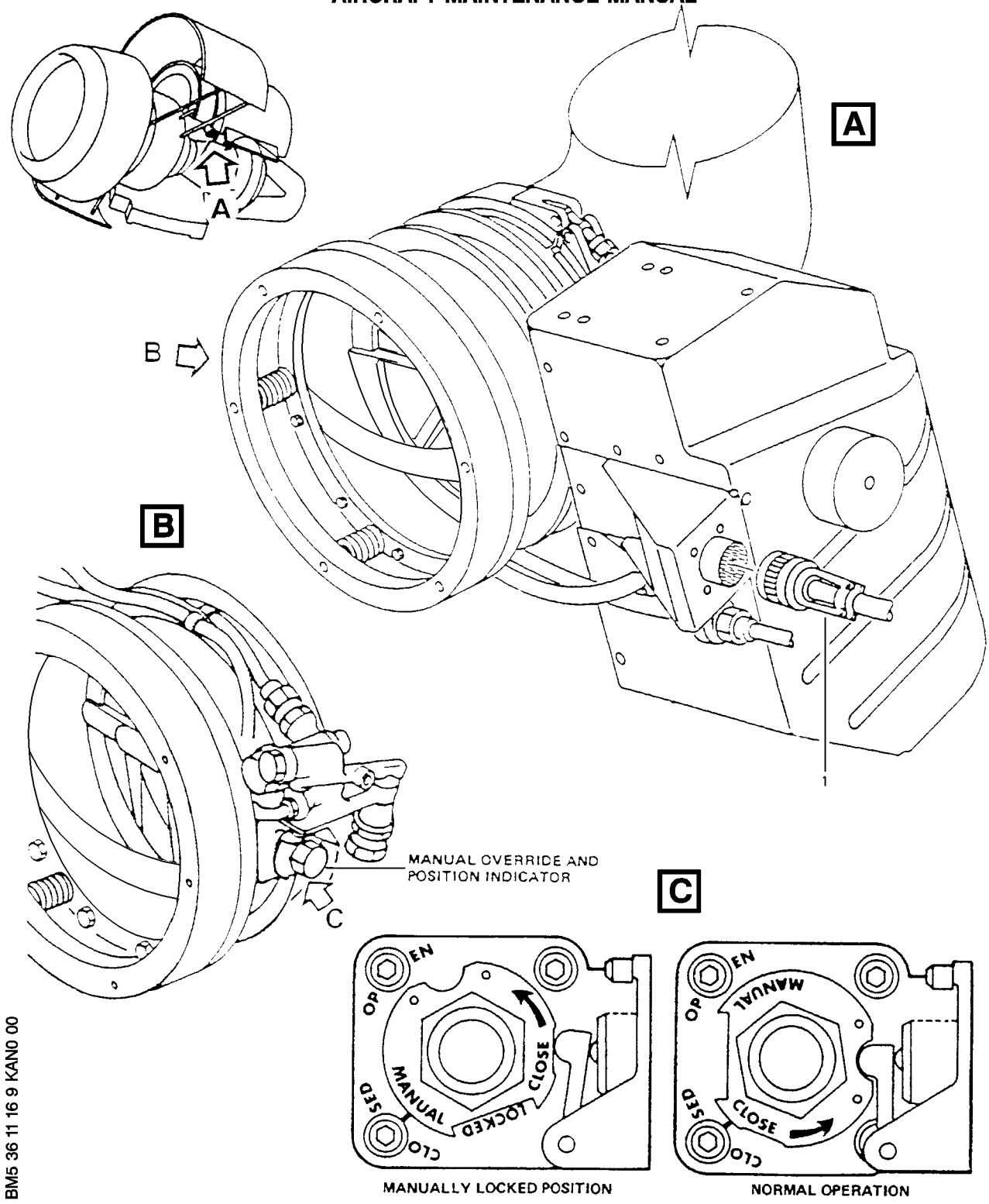
(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68



Fan Air Valve
Figure 901

R



BM5 36 11 16 9 KAN0 00

Fan Air Valve
Figure 902

(b)On AIR BLEED panel 436VU
- Release ENG 1 (ENG 2) BLEED VALVE pushbutton switch. OFF legend comes on.

(c)Position access platform.

(d)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).

(2)Deactivation

(a)Disconnect electrical connector (1).

R (b)Remove lockwire and move fan air valve 51 HA (52 HA) manually to CLOSED
R position. Secure manual override with lockwire.

(c)Connect electrical connector (1).

(d)On AIR BLEED panel 436VU
- Release X FEED mode pushbutton switch. MAN legend on X FEED pushbutton switch comes on and flowbar on X FEED valve position pushbutton switch is cross line.
- Press X FEED valve position pushbutton switch. Flowbar on X FEED valve position pushbutton switch is in line.

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Remove warning notices.

(c)Close engine cowls (Ref. 71-13-00, P. Block 301).

(d)Remove access platform.

(e)Remove safety clips and tags and close circuit breakers.

R (f)Install temporary placard in flight compartment to warn flight crew
R that left (right) fan air valve is deactivated.

R (g)Make entry in aircraft technical log.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
1.	Access Platform 2.5 m (8 ft.)
2.	Circuit Breaker Safety Clips
R 3.	Corrosion Resistant Steel Lockwire Dia. 0.8 mm
R	(0.03 in.)
Referenced Procedure	
- 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)

**ON A/C 105-200,

Post SB 36-2029 For A/C 105-200,

(Ref. Fig. 902)

**ON A/C 101-200,

(1)Job set-up
(a)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
133VU	ENG 1 & 2/START CTL & WARN	1KG	335/R68
133VU	ENG 1 & 2/IGNITION/SYST A	1JH	334/S72
133VU	ENG 1 & 2/IGNITION/SYST B	2JH	333/T72
133VU	ENG 1/REV/CTL	1KM	332/U69
133VU	ENG 2/REV/CTL	2KM	331/V74

(b)Position access platform.
(c)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).
(2)Reactivation
(a)Disconnect electrical connector (1).
(b)Remove lockwire and return manual override to normal operation position (clockwise).
R (c)Safety manual override with lockwire.
R (d)Connect electrical connector (1).
R (e)On AIR BLEED panel 436VU
- Press ENG 1 (ENG 2) BLEED VALVE pushbutton switch. OFF legend goes off.
- Release X FEED valve position pushbutton switch. Flowbar is cross line.
- Press X FEED mode pushbutton switch. MAN legend goes off.
R (f)Trouble shoot the system (Ref. TSM Chapter 36-11).
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove temporary placard.
(c)Clear technical log.
(d)Close engine cowls (Ref. 71-13-00, P. Block 301).
(e)Remove access platform.
(f)Remove safety clips and tags and close circuit breakers 1KG, 1JH, 2JH, 1KM, 2KM).

OVERPRESSURE VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. PRESSURIZATION OF PNEUMATIC SYSTEM
. START UP OF APPROPRIATE ENGINE.

NOTE : Removal/Installation procedures for overpressure valves located in left and right engine pylons are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft.)
B.	Torque Wrench 0 to 1.13 m. daN (0 to 100 lbf. in.)
C.	Blanking Plugs/Caps
D.	Warning Notices
E. Material No. P05-034	Special Materials (Ref. 70-00-00)
F. Material No. P05-169	Special Materials (Ref. 70-00-00)
G. Material No. P05-289	Special Materials (Ref. 70-00-00)
Referenced Procedure	
- 54-52-61, P. Block 401	Pressure Relief Doors
- 71-00-00, P. Block 201	Engine

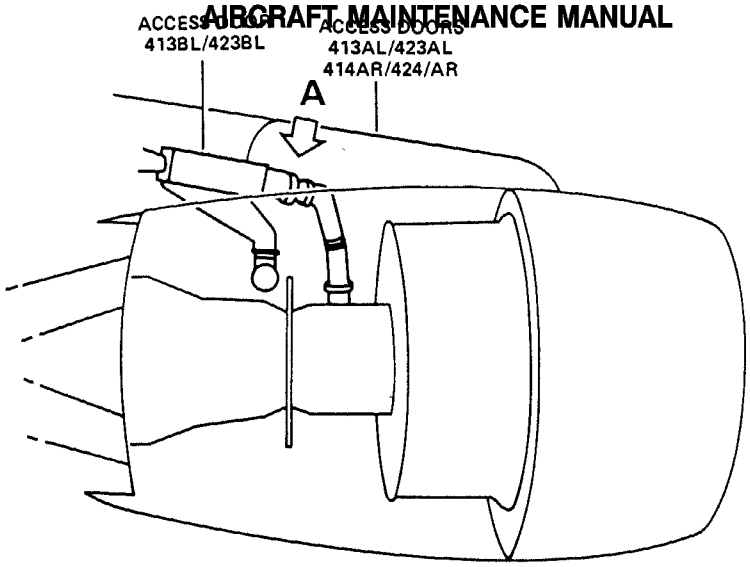
2. Procedure

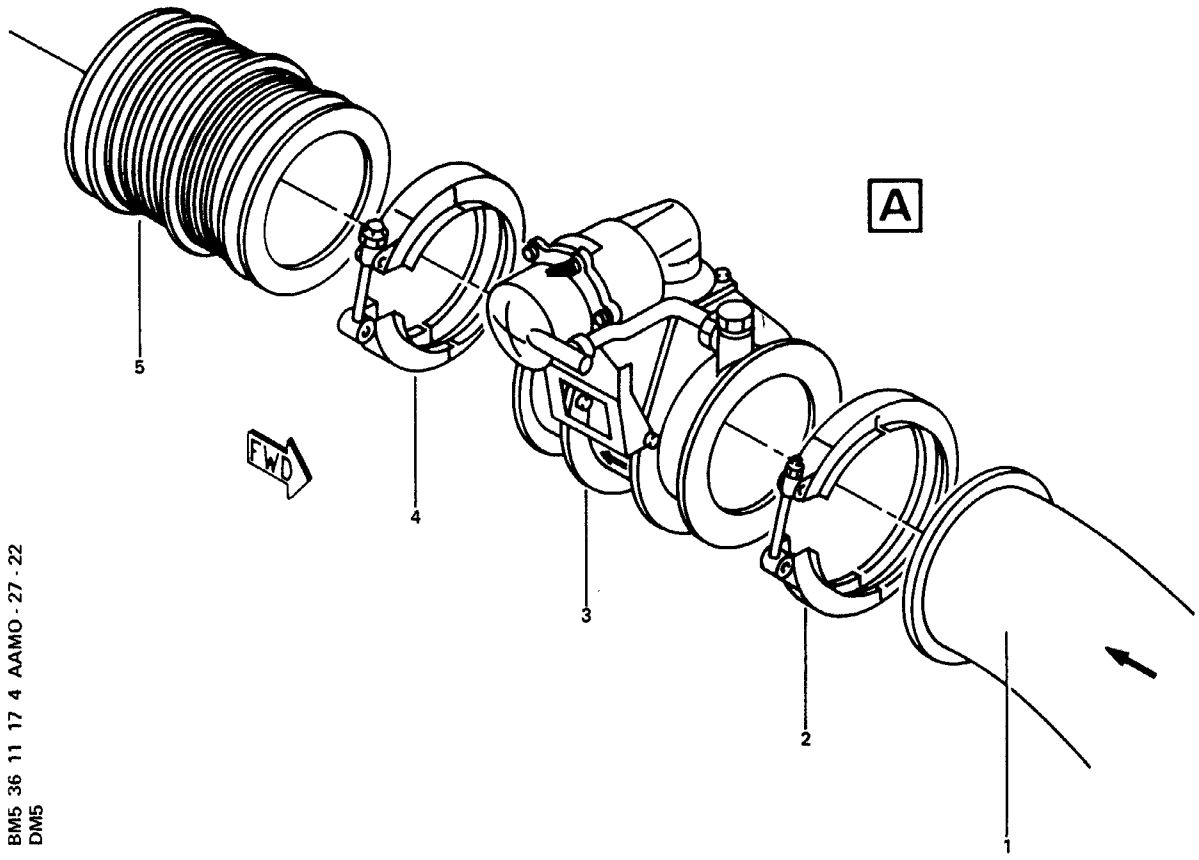
R (Ref. Fig. 401)

A. Job Set-Up
(1)On AIR BLEED section of panel 436VU :
(a)Make sure that X FEED valve position pushbutton switch is released (out).
(b)Make sure that APU BLEED switch is in OFF/R position.
(c)Put a warning notice to tell persons not to operate engine bleed air system.
(2)Put warning notice on HP ground connector access door 144BR to tell persons not to pressurize pneumatic system.
(3)Position access platform.
(4)Remove pressure relief doors 413AL and 414AR (423AL and 424AR) (Ref. 54-52-61, P. Block 401).
(5)Remove precooler access door 413BL (423BL).

B. Removal
(1)Remove clamps (4) and (2) and remove valve (3).
(2)Cap open ends of duct (1) and various removed ducts and components.

C. Installation
(1)Clean and inspect valve interface and/or adjacent area.
(2)Remove blanking plugs/caps and check for correct condition of duct (1)





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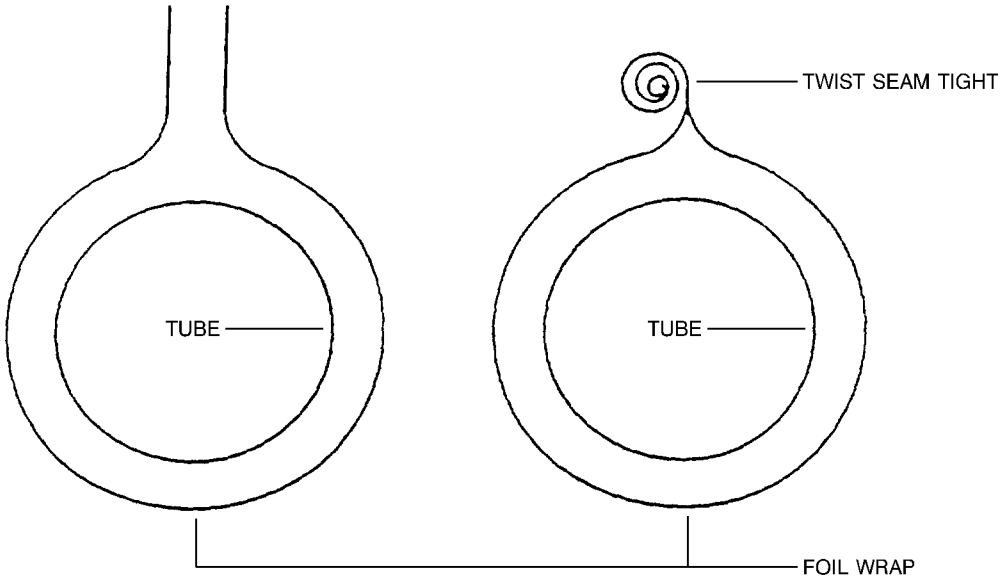
R

Overpressure Valve
Figure 401

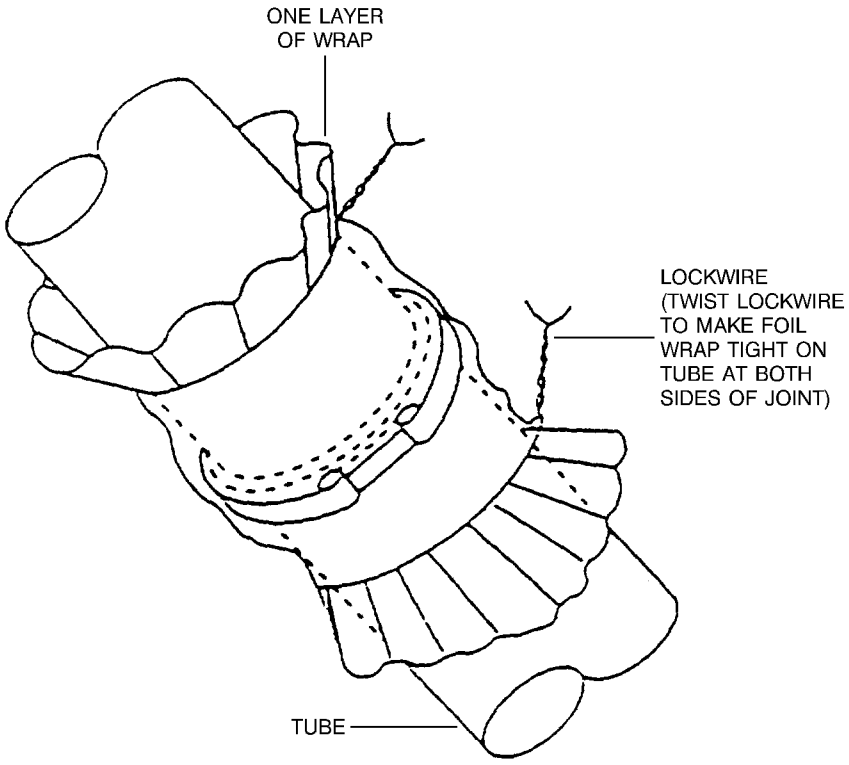
flange.
(3)Install valve (3) on duct (1) with actuator uppermost and arrow indicating airflow direction pointing rearwards. Install clamp (2) ; do not fully tighten at this stage.
(4)Install clamp (4) ; do not fully tighten at this stage.
(5)Rotate valve (3) to correct position.
(6)Tighten nuts of clamps (2) and (4) ; TORQUE to value given on clamps.

R D. Leak Test (Ref. Fig. 402)
R (1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No. P05-034) around the pneumatic joint or you can install aluminum foil (Material No. P05-169) around the pneumatic joint locations.
R Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
R (a)Wind the foil wrap around the joint one time.
R (b)Twist the seam of the foil wrap tight as shown.
R (c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
R (d)Attach the foil wrap with stainless steel lockwire (Material No. P05-289) at both sides of the pneumatic joint.
R (2)Start the related engine (Ref. 71-00-00, P. Block 201) and keep it at idle for 5 minutes.
R (3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 201).
R (4)Make sure that there are no leaks at the junction between the overpressure valve and the duct on the related engine.

R E. Close-Up
R (1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (2)Install precooler access door 413BL (423BL).
R (3)Install pressure relief doors 413AL and 414AR (423AL and 424AR) (Ref. 54-52-61, P. Block 401).
R (4)Remove warning notices.
R (5)Remove access platform.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 17 4 ABM0 01

R Foil Wrap Installation at Pneumatic System Joints
Figure 402

OVERPRESSURE VALVE - REMOVAL/INSTALLATION

WARNING : - BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICES PROHIBITING :
. PRESSURIZATION OF PNEUMATIC SYSTEM
. START UP OF APPROPRIATE ENGINE.

NOTE : Removal/Installation procedures for overpressure valves located in left and right engine pylons are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4 m (13 ft.)
B.	Torque Wrench 0 to 1.13 m. daN (0 to 100 lbf. in.)
C.	Blanking Plugs/Caps
D.	Warning Notices
E.	Aluminum Foil
F. Material No. C05-061	Special Materials (Ref. 70-00-00)
G. Material No. C10-071	Special Materials (Ref. 70-00-00)
Referenced Procedure	
- 54-52-61, P. Block 401	Pressure Relief Doors
- 71-00-00, P. Block 501	Power Plant

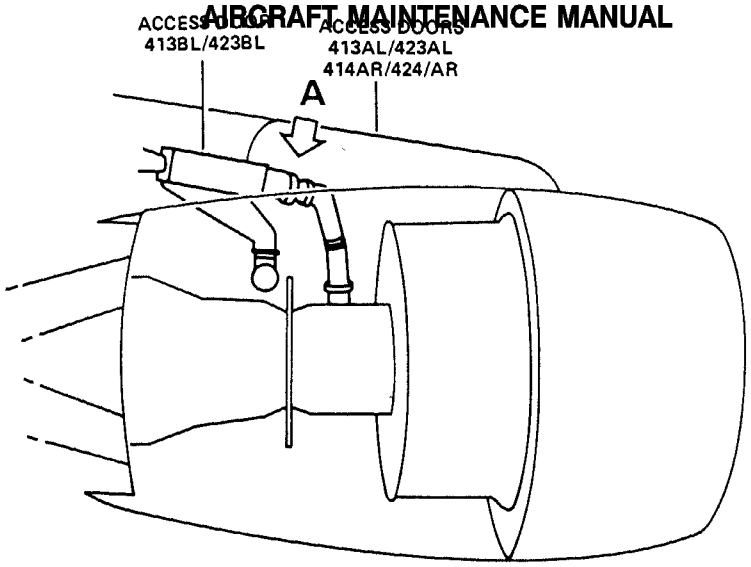
2. Procedure

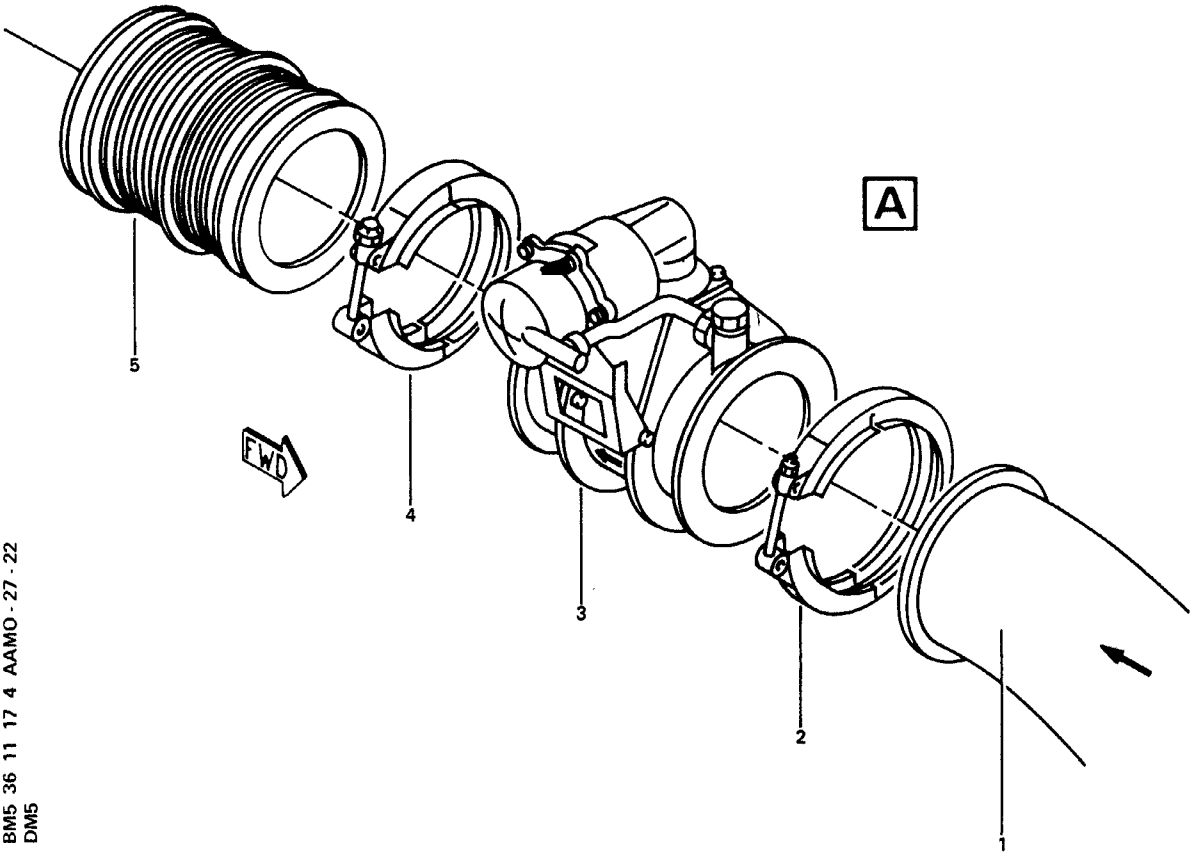
R (Ref. Fig. 401)

A. Job Set-Up
(1)On AIR BLEED section of panel 436VU :
(a)Make sure that X FEED valve position pushbutton switch is released (out).
(b)Make sure that APU BLEED switch is in OFF/R position.
(c)Put a warning notice to tell persons not to operate engine bleed air system.
(2)Put warning notice on HP ground connector access door 144BR to tell persons not to pressurize pneumatic system.
(3)Position access platform
(4)Remove pressure relief doors 413AL and 414AR (423AL and 424AR) (Ref. 54-52-61, P. Block 401).
(5)Remove precooler access door 413BL (423BL).

B. Removal
(1)Remove clamps (4) and (2) and remove valve (3).
(2)Cap open ends of duct (1) and various removed ducts and components.

C. Installation
(1)Clean and inspect valve interface and/or adjacent area.
(2)Remove blanking plugs/caps and check for correct condition of duct (1)





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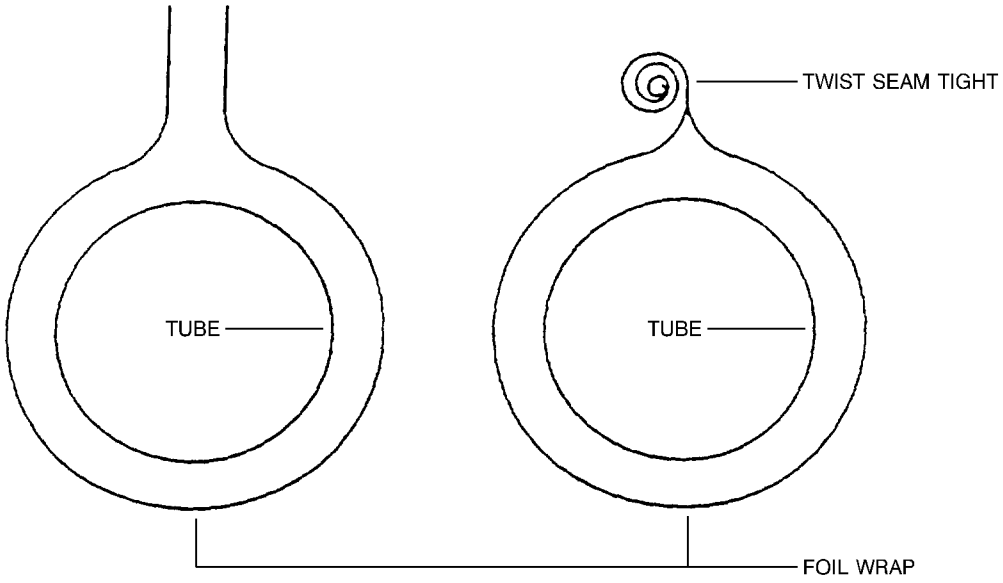
R

Overpressure Valve
Figure 401

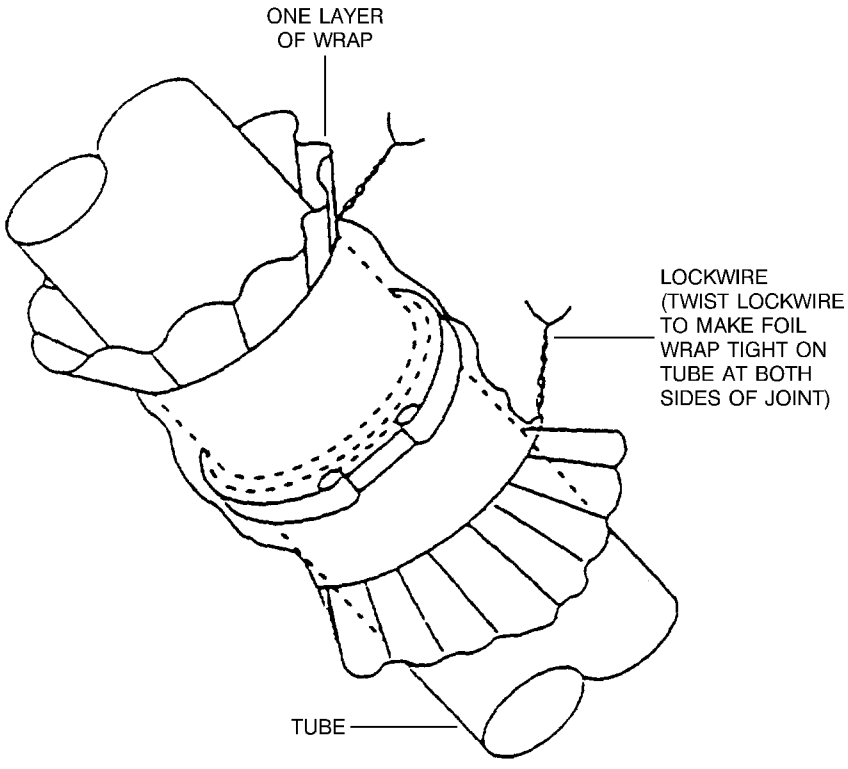
flange.
(3)Install valve (3) on duct (1) with actuator uppermost and arrow indicating airflow direction pointing rearwards. Install clamp (2) ; do not fully tighten at this stage.
(4)Install clamp (4) ; do not fully tighten at this stage.
(5)Rotate valve (3) to correct position.
(6)Tighten nuts of clamps (2) and (4) ; TORQUE to value given on clamps.

D. Leak Test(Ref. Fig. 402)
(1)There are two possible procedures to find the location of a pneumatic joint air leak. You can apply dry developer (Material No. C05-061) around the pneumatic joint or you can install aluminum foil around the pneumatic joint locations.
Use the steps that follow to apply aluminum foil to the pneumatic joint locations :
(a)Wind the foil wrap around the joint one time.
(b)Twist the seam of the foil wrap tight as shown.
(c)Make the foil wrap as tight as possible on the tube but do not rip the wrap.
(d)Attach the foil wrap with stainless steel lockwire (Material No. C10-071) at both sides of the pneumatic joint.
(2)Start the related engine (Ref. 71-00-00, P. Block 501) and keep it at idle for 5 minutes.
(3)After 5 minutes, shut down the engine (Ref. 71-00-00, P. Block 501).
(4)Make sure that there are no leaks at the junction between the overpressure valve and the duct on the related engine.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install precooler access door 413BL (423BL).
(3)Install pressure relief doors 413AL and 414AR (423AL and 424AR) (Ref. 54-52-61, P. Block 401).
(4)Remove warning notices.
(5)Remove access platform.



TYPICAL CROSS-SECTION OF FOIL WRAP



BM5 36 11 17 4 ABM0 01

Foil Wrap Installation at Pneumatic System Joints
Figure 402

OVERPRESSURE VALVE - ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- **DISPLAY A WARNING NOTICE ON THE HP GROUND CONNECTORS PROHIBITING OPERATION OF THE PNEUMATIC SYSTEM.**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Functional Test

A. Equipment and Materials

ITEM	DESIGNATION
A. 290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
B.	Lockwire Dia. 0.8 mm (0.031 in.)
C.	Gasket
D.	Access Platform 4.30 m (12 ft.)
E.	Warning Notices
F.	Blanking Plugs/Caps
G. 290435-1-1 (Ref. Fig. 501) (Ref. Fig. 502)	Adapter-Valve Test

B. Procedure

(1)Job set-up
- (a)Position access platform.
- (b)Open pressure relief doors 413AL and 414AR (423AL and 424AR).
- (c)Open precooler access door 413BL (423BL).
- (d)On overpressure valve
  - Cut and remove lockwire and remove plug from test port D.
  - Install adapter R on test port D.
- (e)Make certain that all test set controls are in OFF position.
- (f)Connect test set outlet union No. 1 to adapter R of test port D.

(2)Test

NOTE : The overpressure valve must be open at the beginning of test.

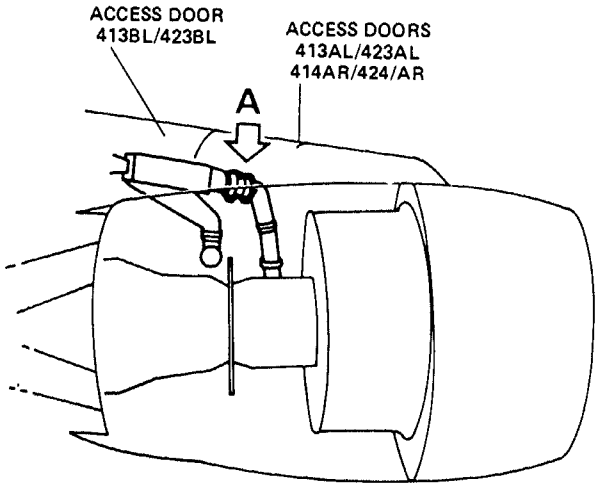
ACTION	RESULT
1. On test set - place SYSTEM SELECTOR in B position - open cylinder shutoff valve - slowly increase pressure by means of PRIMARY REGULATOR until reading on PRIMARY GAGE reaches 45 psi and check valve visual position indicator.	- valve remains open.
2. Continue to increase pressure on	- valve starts to close when

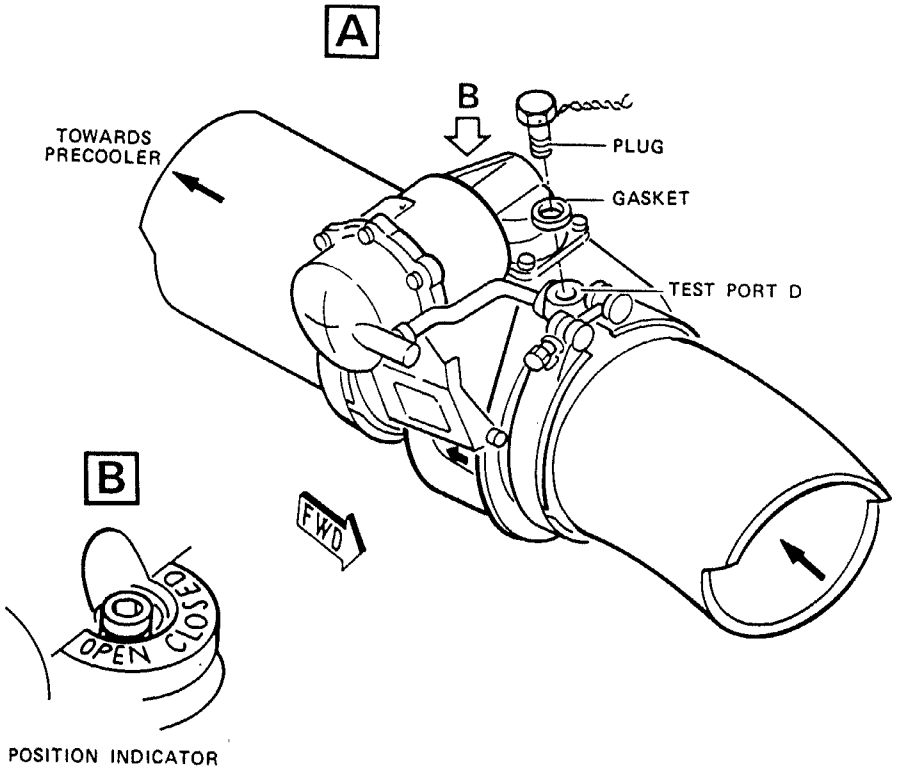
ACTION	RESULT
PRIMARY GAGE while checking valve visual position indicator.	pressure reaches within **73** and **80** psi and is fully closed at no more than **90** psi (visual position indicator in **CLOSED** position).
3. Slowly reduce pressure on **PRIMARY GAGE** while checking valve visual position indicator.	- valve opens and is fully open when pressure is not less than **40** psi (visual position indicator in **OPEN** position).

(3)Close-up
(a)On test set
- close cylinder shutoff valve
- shut down pressure until **PRIMARY GAGE** reads zero
- place all controls in **OFF** position.

(b)Disconnect test set
(c)On overpressure valve :
- remove adapter **R** from test port
- using a new gasket, install plug on test port and wirelock.

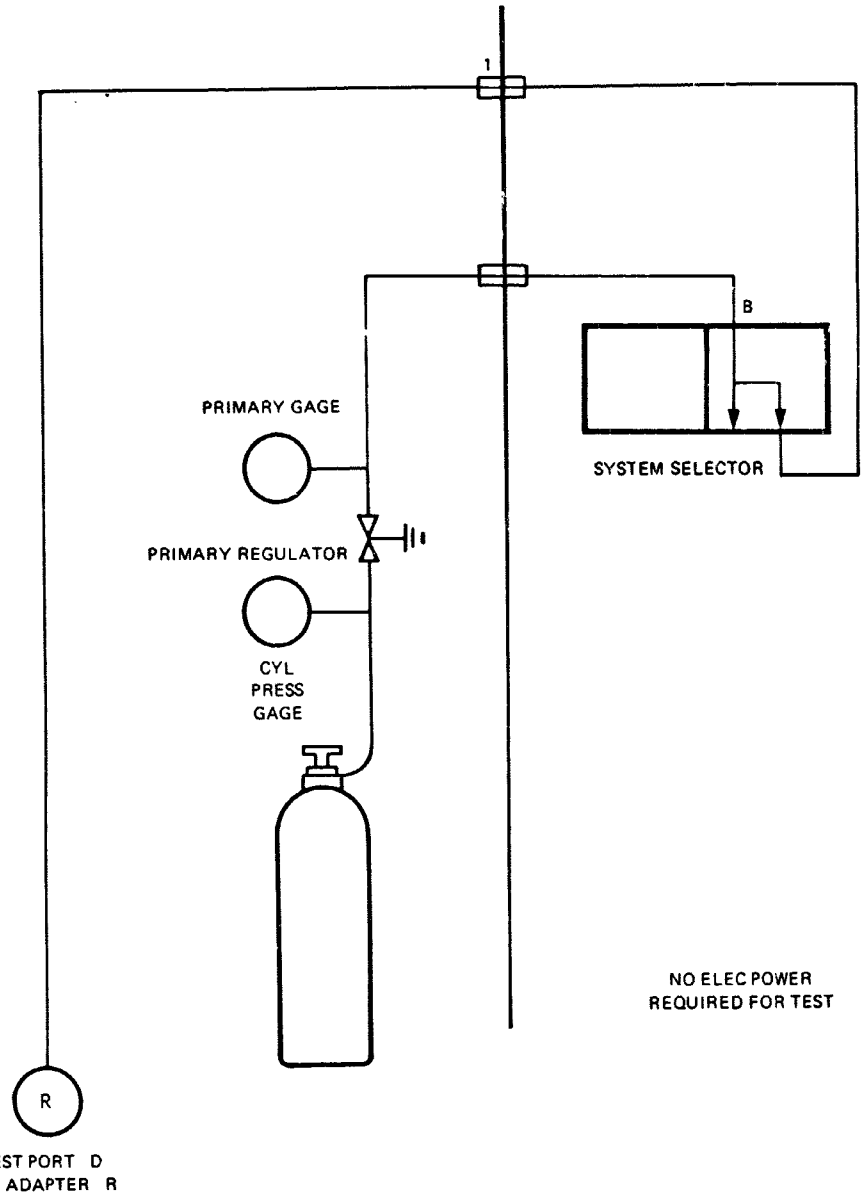
(d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(e)Close pressure relief doors and procooler access door.
(f)Remove access platform.
(g)Remove warning notices.





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DM5

Overpressure Valve - Test Port
Figure 501



BM5 36 11 17 5 ACMO

Test Set - Connection Diagram
Figure 502

OVERPRESSURE VALVE - ADJUSTMENT/TEST

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- **DISPLAY A WARNING NOTICE ON THE HP GROUND CONNECTORS PROHIBITING OPERATION OF THE PNEUMATIC SYSTEM.**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Functional Test

A. Equipment and Materials

ITEM	DESIGNATION
A. 290121-4	Test Set - Valve Actuating
R or	
R 3792195-1	Test Set - Valve Actuating
B.	Lockwire Dia. 0.8 mm (0.031 in.)
C.	Gasket
D.	Access Platform 4.30 m (12 ft.)
E.	Warning Notices
F.	Blanking Plugs/Caps
G. 290435-1-1 (Ref. Fig. 501) (Ref. Fig. 502)	Adapter-Valve Test

B. Procedure

(1)Job set-up

(a)Position access platform.

(b)Open pressure relief doors 413AL and 414AR (423AL and 424AR).

(c)Open precooler access door 413BL (423BL).

(d)On overpressure valve
- Cut and remove lockwire and remove plug from test port D.
- Install adapter R on test port D.

(e)Make certain that all test set controls are in OFF position.

(f)Connect test set outlet union No. 1 to adapter R of test port D.

(2)Test

NOTE : The overpressure valve must be open at the beginning of test.

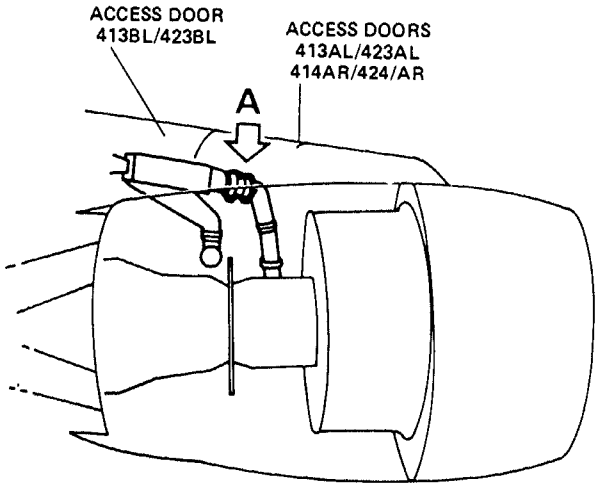
ACTION	RESULT
1. On test set - place SYSTEM SELECTOR in B position - open cylinder shutoff valve - slowly increase pressure by means of PRIMARY REGULATOR until reading on PRIMARY GAGE reaches 45 psi and check valve visual position indicator.	- valve remains open.
2. Continue to increase pressure on	- valve starts to close when

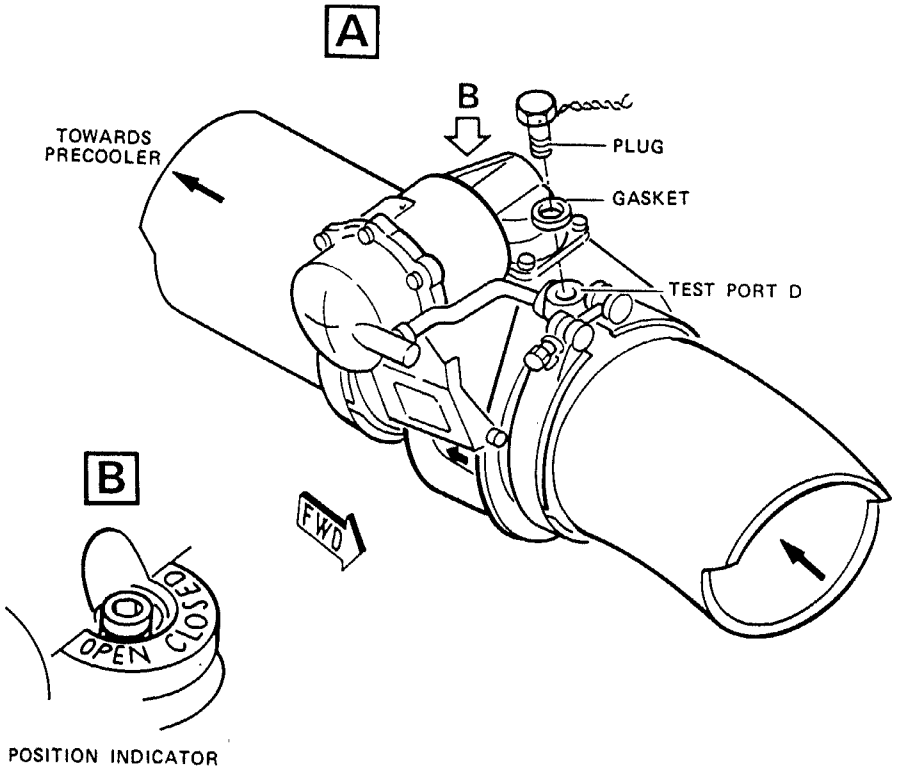
ACTION	RESULT
PRIMARY GAGE while checking valve visual position indicator.	pressure reaches within **73** and **80** psi and is fully closed at no more than **90** psi (visual position indicator in **CLOSED** position).
3. Slowly reduce pressure on **PRIMARY GAGE** while checking valve visual position indicator.	- valve opens and is fully open when pressure is not less than **40** psi (visual position indicator in **OPEN** position).

(3)Close-up
(a)On test set
- close cylinder shutoff valve
- shut down pressure until **PRIMARY GAGE** reads zero
- place all controls in **OFF** position.

(b)Disconnect test set
(c)On overpressure valve :
- remove adapter **R** from test port
- using a new gasket, install plug on test port and wirelock.

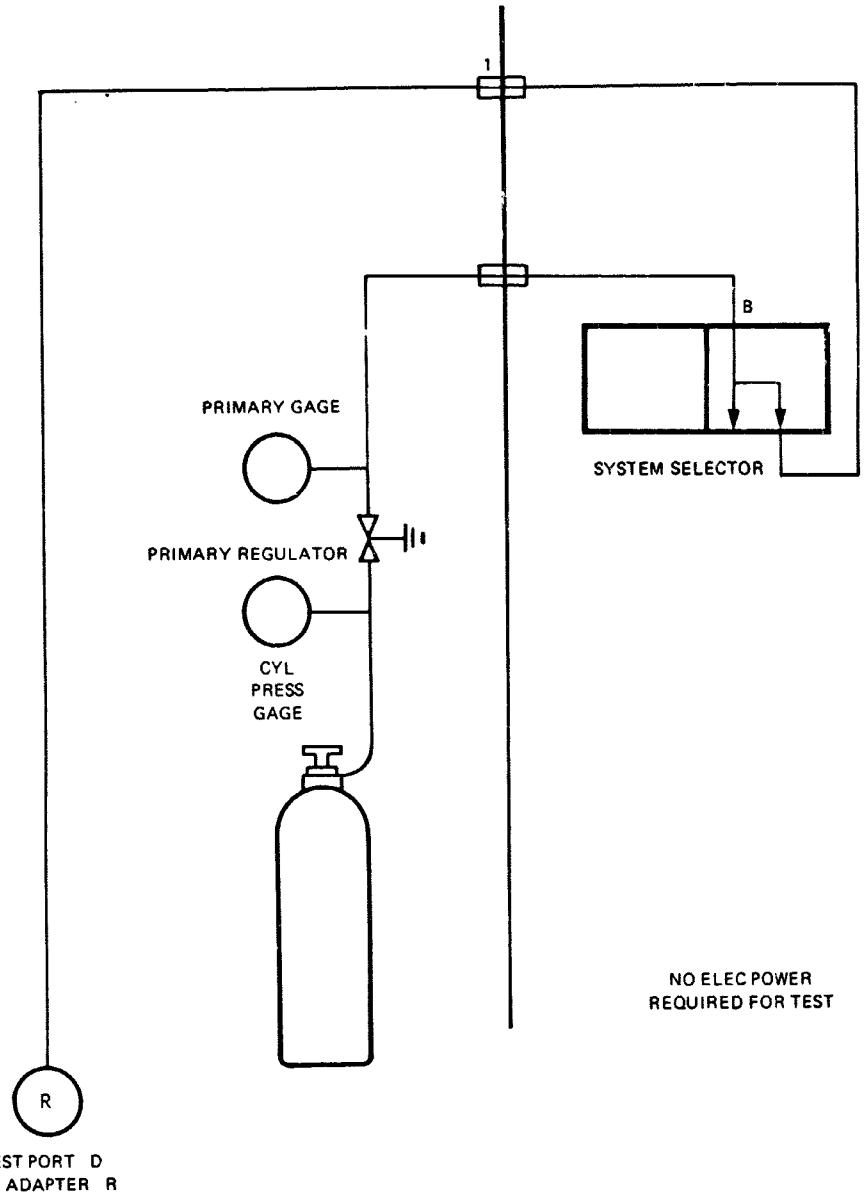
(d)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(e)Close pressure relief doors and procooler access door.
(f)Remove access platform.
(g)Remove warning notices.





BM5 36 11 17 5 AAMO-27-22
DM5

Overpressure Valve - Test Port
Figure 501



BM5 36 11 17 5 ACMO

Test Set - Connection Diagram
Figure 502

OVERPRESSURE VALVE - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.

1. Reason for the Job

Visual check of the overpressure valve for correct condition.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4.3 m (12 ft.)
B.	Warning Notice

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open pressure relief doors 413AL and 414AR (423AL and 424AR).

B. Inspection/Check
(1)Make certain that the visual position indicator is in full OPEN position.
(2)Visually check overpressure valve for correct condition (traces of corrosion, cracks or damage to ducts).
(3)Make certain that clamps attaching overpressure valve to engine bleed air duct are correctly installed and tightened.

C. Close-up
(1)Close pressure relief doors.
(2)Remove access platform.
(3)Remove warning notice.

OVERPRESSURE VALVE - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.

1. Reason for the Job

Visual check of the overpressure valve for correct condition.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 4.3 m (12 ft.)
B.	Warning Notice

3. Procedure

A. Job Set-Up
(1)Position access platform.
(2)Open pressure relief doors 413AL and 414AR (423AL and 424AR).

B. Inspection/Check
(1)Make certain that the visual position indicator is in full OPEN position.
(2)Visually check overpressure valve for correct condition (traces of corrosion, cracks or damage to ducts).
(3)Make certain that clamps attaching overpressure valve to engine bleed air duct are correctly installed and tightened.

C. Close-up
(1)Close pressure relief doors.
(2)Remove access platform.
(3)Remove warning notice.

HIGH STAGE TEMPERATURE SENSOR (T3) - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Torque Wrench 24-70 lbf.in. (0.27 - 0.79 m.daN)
C.	Lockwire DIA. 0.8 mm (0.032 in.)
D.	Gasket
E.	Circuit Breaker Safety Clips
Referenced Procedures	
- 36-11-00, P. Block 501	Engine Bleed Air Supply System
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED & COMPT TEMP/ENG1 CONTROLLER/ MONITOR	5HA	209/A17
22VU	AIR BLEED & COMPT TEMP/ENG1 CONTROLLER/ CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG2 CONTROLLER/ CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2 CONTROLLER/ MONITOR	6HA	315/D54

(2)Open LH thrust reverser door (Ref. 71-13-00, P. Block 301).

(3)Install access platform.

Pre GE SB 77-005

B. Removal

(Ref. Fig. 401)

(1)Disconnect the electrical connectors (7) from the T3 sensor junction box, if installed.

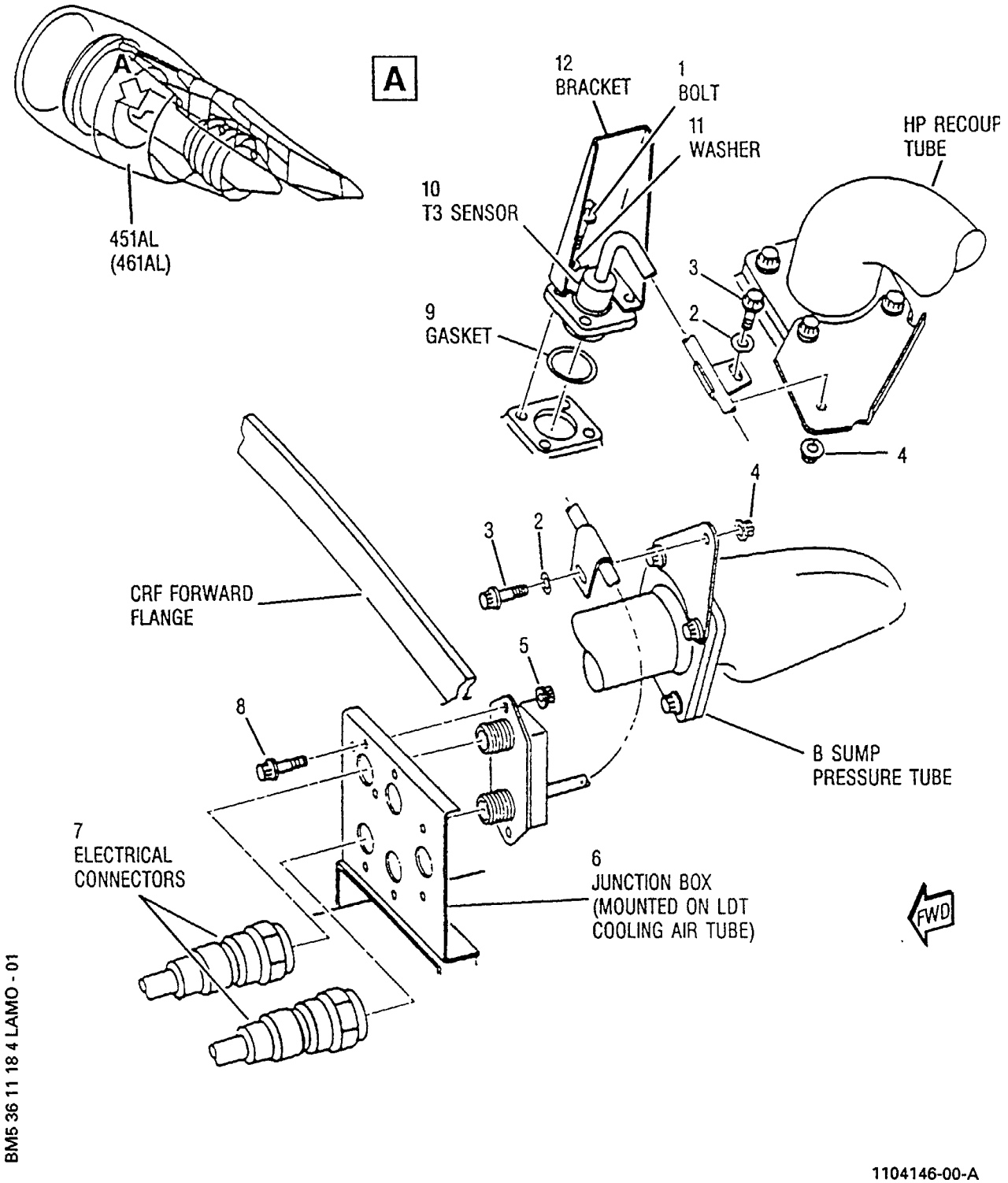
(2)Remove the two nuts (4), bolts (3), and washers (2) that attach the T3 sensor conduit brackets to the B-sump pressure tube and HP recoup tube.

(3)Remove the two nuts (5) and bolts (8) that attach the T3 sensor junction box to the mounting bracket (6).

(4)Remove the lockwire from the four bolts (1).

(5)Remove the four bolts (1) and washers (11) that attach the bracket (12) and T3 sensor (10) to the compressor rear frame.

(6)Carefully remove the T3 sensor (10) and gasket (9) from the mounting



Pre GE SB 77-005 High Stage Temperature Sensor (T3)
Removal/Installation
Figure 401

boss, and remove the T3 sensor and conduit from under adjacent tubing. Discard the gasket (9).

End Pre GE SB 77-005

Post GE SB 77-001

B. Removal

R (Ref. Fig. 402)

(1)Disconnect the electrical connectors (13) from the T3 sensor junction box (9), if installed.

(2)Remove the two nuts (6), bolts (7), and washers (8) that attach the T3 sensor conduit brackets to the B-sump pressure tube and HP recoup tube.

(3)Remove the two nuts (14), bolts (16), and three washers (15) that attach the T3 sensor conduit brackets to the air manifold (16) and junction box bracket (11).

(4)Remove the two bolts (12) and nuts (10) that attach the junction box (9) to the junction box bracket (11).

(5)Remove the lockwire from the four bolts (4).

(6)Remove the four bolts (4) and washers (5) that attach the bracket (3) and T3 sensor (2) to the compressor rear frame.

(7)Carefully remove the sensor (2) and gasket (1) from the mounting boss. Move the sensor and conduit from under the adjacent tubing. Discard the gasket (1).

End Post Ge SB 77-005

Pre GE SB 77-005

C. Installation (Ref. Fig. 401)

(1)Carefully install the T3 sensor conduit between the compressor rear frame and adjacent tubing.

(2)Put a new gasket (9) over the mounting boss and put the T3 sensor (10) into position. Attach the T3 sensor and bracket (12) with four bolts (1) and washers (11). Do not torque at this time.

(3)Attach the T3 junction box to the junction box bracket (6) with two bolts (8) and nuts (5). Do not torque at this time.

(4)Attach the T3 sensor conduit brackets to the B-sump pressure tube and HP recoup tube. Use two bolts (3), washers (2), and nuts (4). TORQUE the nuts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(5)TORQUE the four bolts (1) to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN) and wirelock.

(6)TORQUE the two nuts (5) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(7)Connect the electrical connectors (7) to the T3 junction box.

End Pre Ge SB 77-005

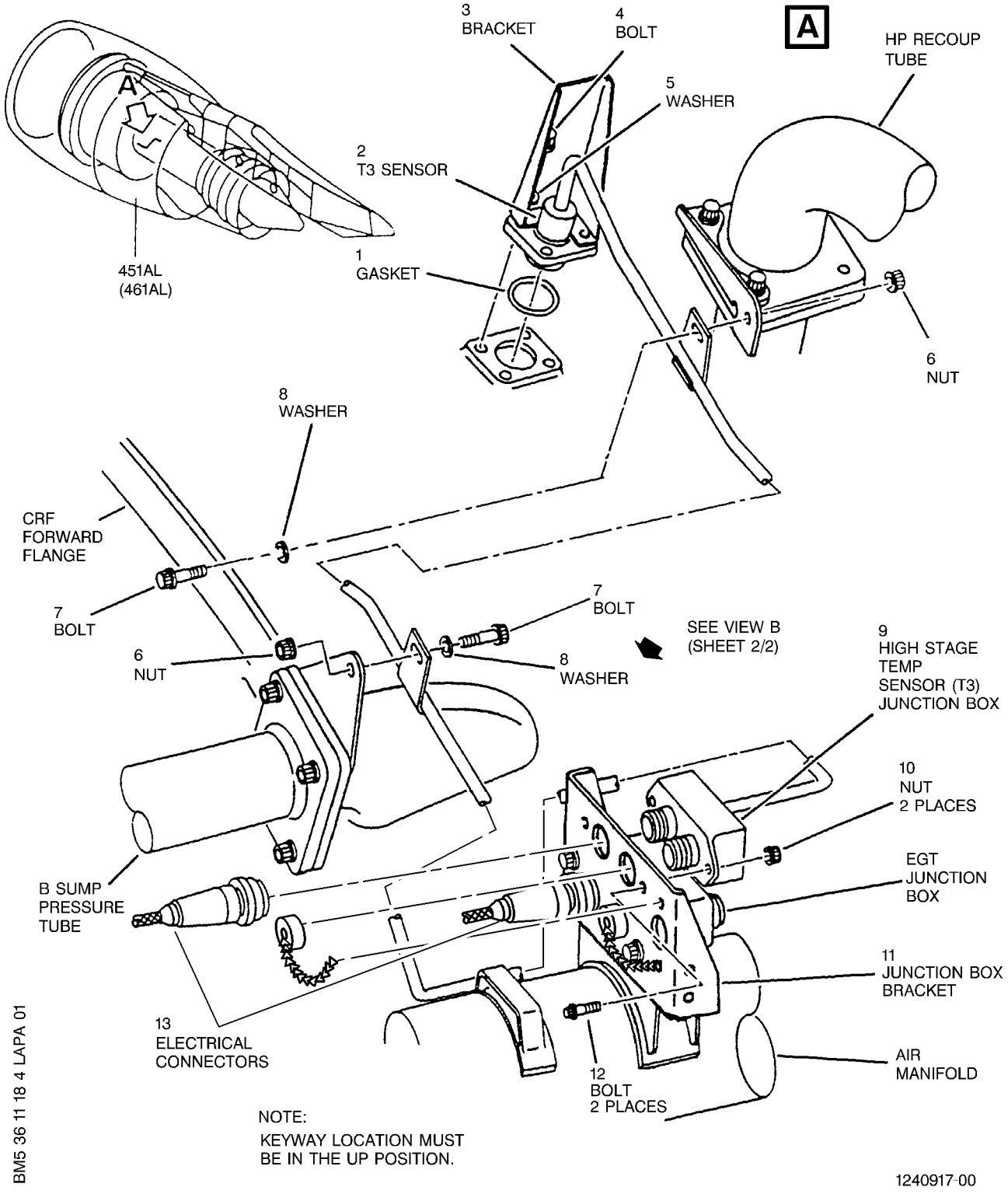
**ON A/C 001-005,

Post GE SB 77-005

C. Installation (Ref. Fig. 402)

(1)Carefully install the T3 sensor conduit between the compressor rear frame and adjacent tubing.

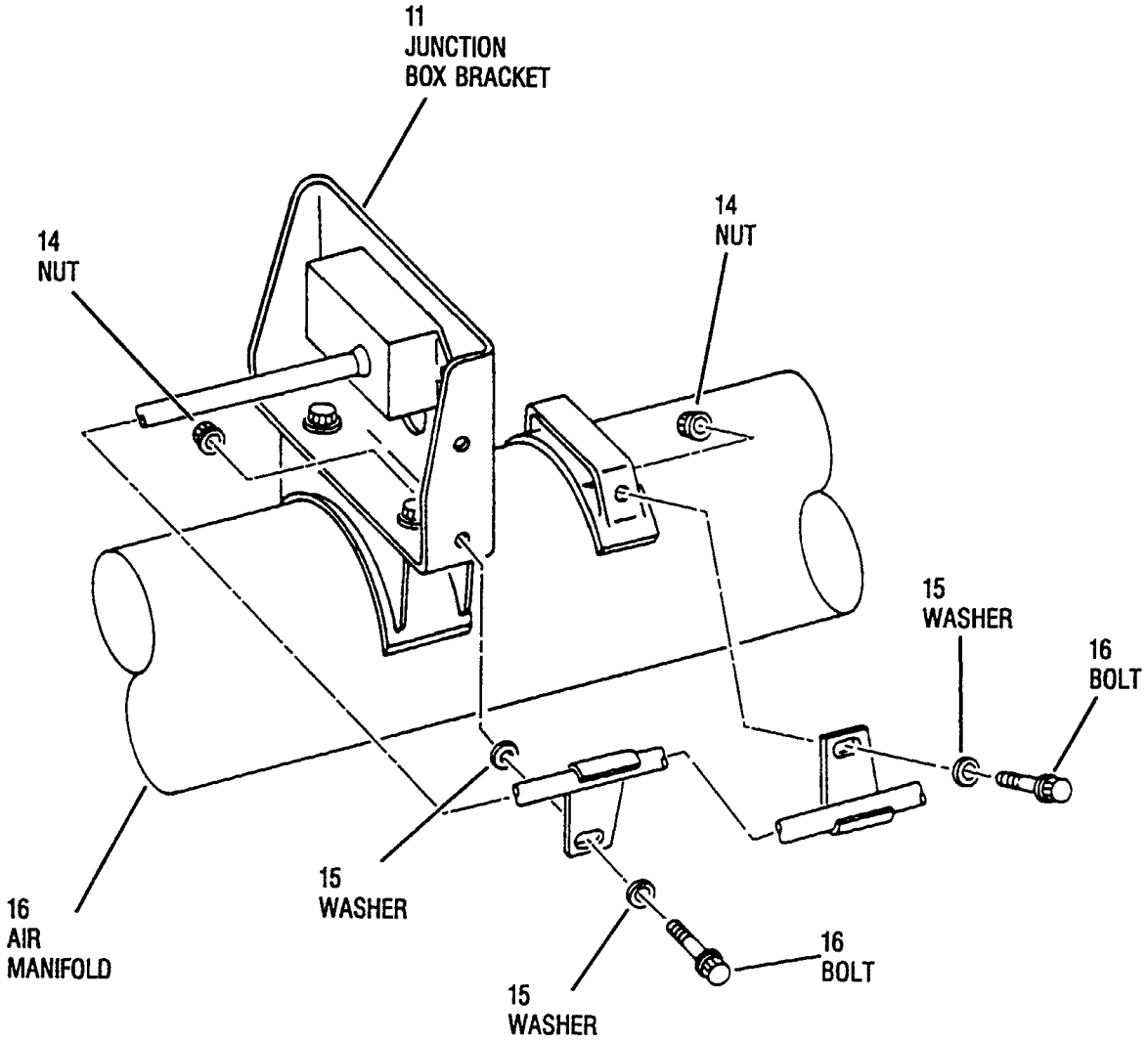
(2)Put a new gasket (1) over the mounting boss and put the T3 sensor (2)



Post GE SB 77-005 High Stage Temperature Sensor (T3)
Removal/Installation (Sheet 1/2)
Figure 402

R

VIEW B OF SHEET 1/2



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Post GE SB 77-005 High Stage Temperature Sensor (T3)
Removal/Installation (Sheet 2/2)
Figure 402

into position. Attach the T3 sensor and bracket (3) with four bolts (4) and washers (5). Do not torque at this time.
(3)Attach the junction box (9) to the mounting bracket (11) with two bolts (12) and nuts (10). Do not torque at this time.
(4)Attach the T3 sensor conduit brackets to the B-sump pressure tube and HP recoup tube. Use two bolts (7), washers (8), and nuts (6). TORQUE the nuts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(5)Install the washer (15) between the junction box bracket (11) and T3 sensor conduit bracket.
(6)Attach the T3 sensor conduit brackets to the junction box bracket (11) and air manifold (16). Use the two bolts (16), washers (15), and nuts (14). TORQUE the nuts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(7)TORQUE the four bolts (4) to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN) and wirelock.
(8)TORQUE the two nuts (10) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(9)Connect the electrical connectors (13) to the junction box (9).

End Post GE SB 77-005

D. Test
(1)Do the BITE test of the pneumatic controller (Ref. 36-11-00, P. Block 501).
(a)On the face of the pneumatic controller, make sure that HI STG TEMP SENSOR light comes on green.

R **ON A/C 001-100,

Post SB 36-2027 For A/C 001-005,

Post GE SB 77-005
C. Installation (Ref. Fig. 402)
(1)Carefully install the T3 sensor conduit between the compressor rear frame and adjacent tubing.
(2)Put a new gasket (1) over the mounting boss and put the T3 sensor (2) into position. Attach the T3 sensor and bracket (3) with four bolts (4) and washers (5). Do not torque at this time.
(3)Attach the junction box (9) to the mounting bracket (11) with two bolts (12) and nuts (10). Do not torque at this time.
(4)Attach the T3 sensor conduit brackets to the B-sump pressure tube and HP recoup tube. Use two bolts (7), washers (8), and nuts (6). TORQUE the nuts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(5)Install the washer (15) between the junction box bracket (11) and T3 sensor conduit bracket.
(6)Attach the T3 sensor conduit brackets to the junction box bracket (11) and air manifold (16). Use the two bolts (16), washers (15), and nuts (14). TORQUE the nuts to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).
(7)TORQUE the four bolts (4) to between 55 and 70 lbf.in. (0.62 and 0.79 m.daN) and wirelock.
(8)TORQUE the two nuts (10) to between 33 and 37 lbf.in. (0.37 and 0.42 m.daN).

(9)Connect the electrical connectors (13) to the junction box (9).

End Post GE SB 77-005

D. Test

(1)Do the BITE test of the pneumatic controller (Ref. 36-11-00, P. Block 501).

(a)On the face of the pneumatic controller, make sure that X HI TEMP SNSR fault message does not appear.

R **ON A/C 001-100,

E. Close-Up

(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2)Remove the access platform.

(3)Close thrust reverser door (Ref. 71-13-00, P. Block 301).

(4)Remove safety clips and tags and close circuit breakers 5HA and 7HA (8HA and 6HA).

HIGH STAGE TEMPERATURE SENSOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform 2.5 m (8 ft.)
B.	TORQUE Wrench 20 - 36 lbf.in. (0.22 - 0.4 m.daN)
C.	Lockwire Dia. 0.8 mm (0.032 in.)
D.	Gasket
E.	Circuit Breaker Safety Clips
F.	Protective Covers
Referenced Procedures	
- 36-11-00, P. Block 501	Engine Bleed Air Supply System
- 71-13-00, P. Block 301	Cowl Doors

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG 1/CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG 1/CONTROLLER/CTL	7HA	209/A18
131VU	AIR BLEED & COMPT TEMP/ENG 2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG 2/CONTROLLER/MONITOR	6HA	315/D54

(2)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).

(3)Install access platform.

B. Removal (Ref. Fig. 401)

(1)Remove nuts and washers from high stage temperature sensor terminal posts and detach electrical wires.

(2)Remove lockwire, sensor and gasket from engine core.

(3)Install protective plug and gasket in sensor engine core mounting port if replacement sensor not available.

C. Installation

(1)Remove protective plug and gasket from high stage temperature sensor engine core mounting port.

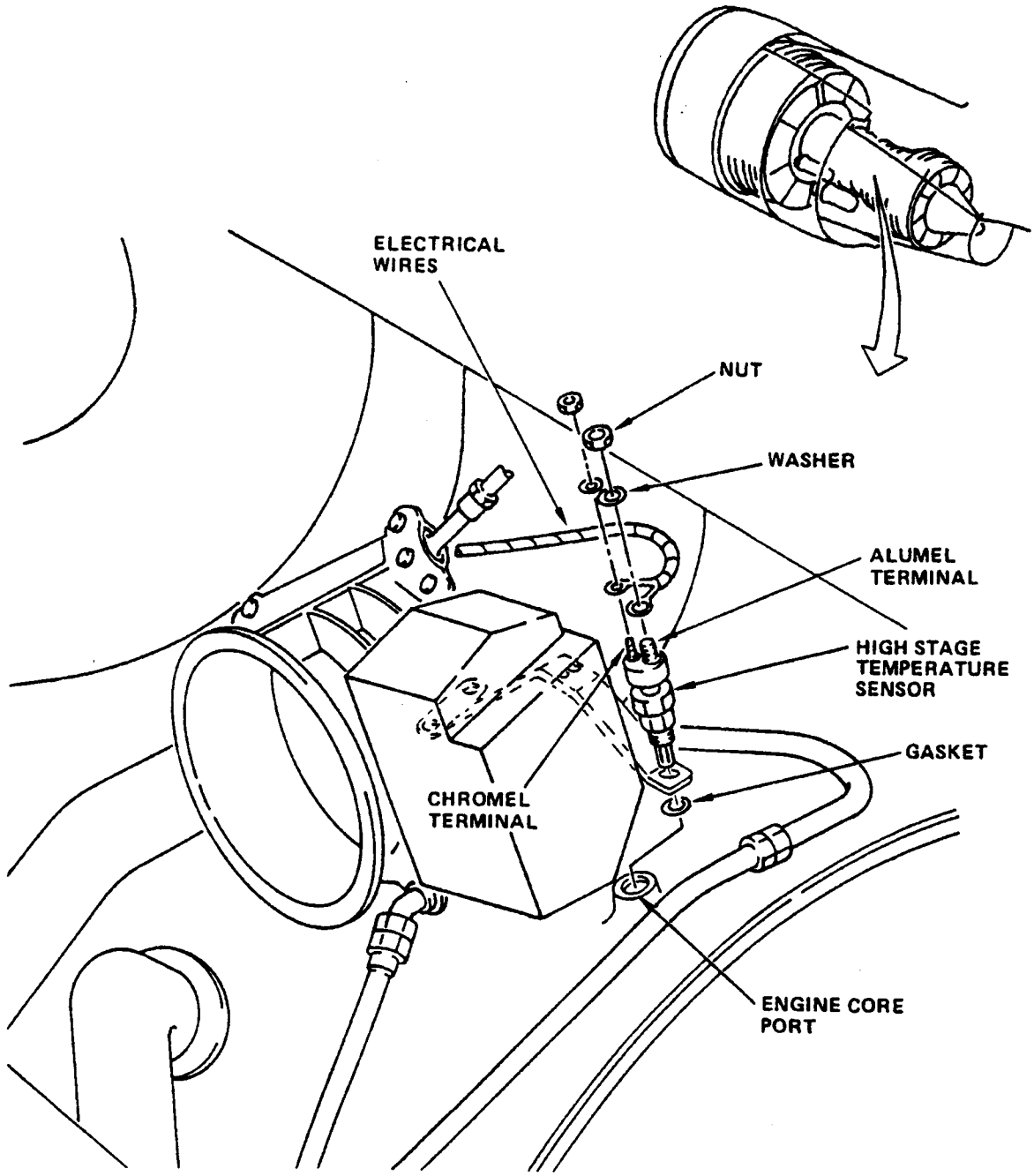
(2)Position the gasket on the engine core mounting port and install the support bracket using existing hardware. Tighten the hardware fingertight only.

NOTE : The gasket is installed under the support bracket.

(3)Install sensor and gasket in engine core mounting port. TORQUE temperature sensor to between 95 and 110 lbf.in. (1.07 and 1.24 m.daN). TORQUE jamnut of sensor to between 70 and 80 lbf.in. (0.79 and 0.90 m.daN) and lockwire.
(4)Attach chromel electrical wire to smaller sensor terminal post with washer and nut. TORQUE nut to between 20 and 22 lbf.in. (0.23 and 0.25 m.daN).
(5)Attach alumel electrical wire to larger sensor terminal post with washer and nut. TORQUE nut to between 32 and 36 lbf.in. (0.36 and 0.41 m.daN).

D. Test
(1)Do the BITE test of the pneumatic controller (Ref. 36-11-00, P. Block 501).
(a)On the face of the pneumatic controller, make sure that X HI TEMP SNSR fault message does not appear.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Remove access platform.
(3)Close thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301).
(4)Remove safety clips and tags and close circuit breakers 5HA and 7HA (6HA and 8HA).



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L-A145R (1298)

High Stage Temperature Sensor
Figure 401

R

HIGH STAGE TEMPERATURE SENSOR (T3) - INSPECTION/CHECK

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Ohmmeter or Wheatstone Bridge
Referenced Procedures	
- 71-13-00, P. Block 301	Cowl Doors
- 36-11-18, P. Block 401	High Stage Temperature Sensor (T3)

2. Procedure

A. Job Set-Up
(1)Open, safety and tag circuit breakers and open left fan, thrust reverser and core cowl doors (Ref. 71-13-00, P. Block 301).
(2)Remove sensor (Ref. 36-11-18, P. Block 401).

B. Inspection/Check

Inspect/Check	Maximum Serviceable Limits	Remarks
(1)Mounting Flanges for :		
(a)Cracks around mounting holes	None allowed	Replace sensor
(2)Connector for :		
(a)Cross threads	None allowed	Replace sensor
(b)Bent pins	None allowed	Replace sensor

C. Close-Up
(1)Install sensor (Ref. 36-11-18, P. Block 401).
(2)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3)Close core cowl, thrust reverser and fan cowl doors (Ref. 71-13-00, P. Block 301). Remove safety clips and tag and close circuit breakers.

HIGH STAGE TEMPERATURE SENSOR (T3) - DEACTIVATION/REACTIVATION

Ref. : MEL Sect. 1-36, Item 5 (HP Temperature Limit Sensor)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

1. Deactivation

A. Equipment and Materials

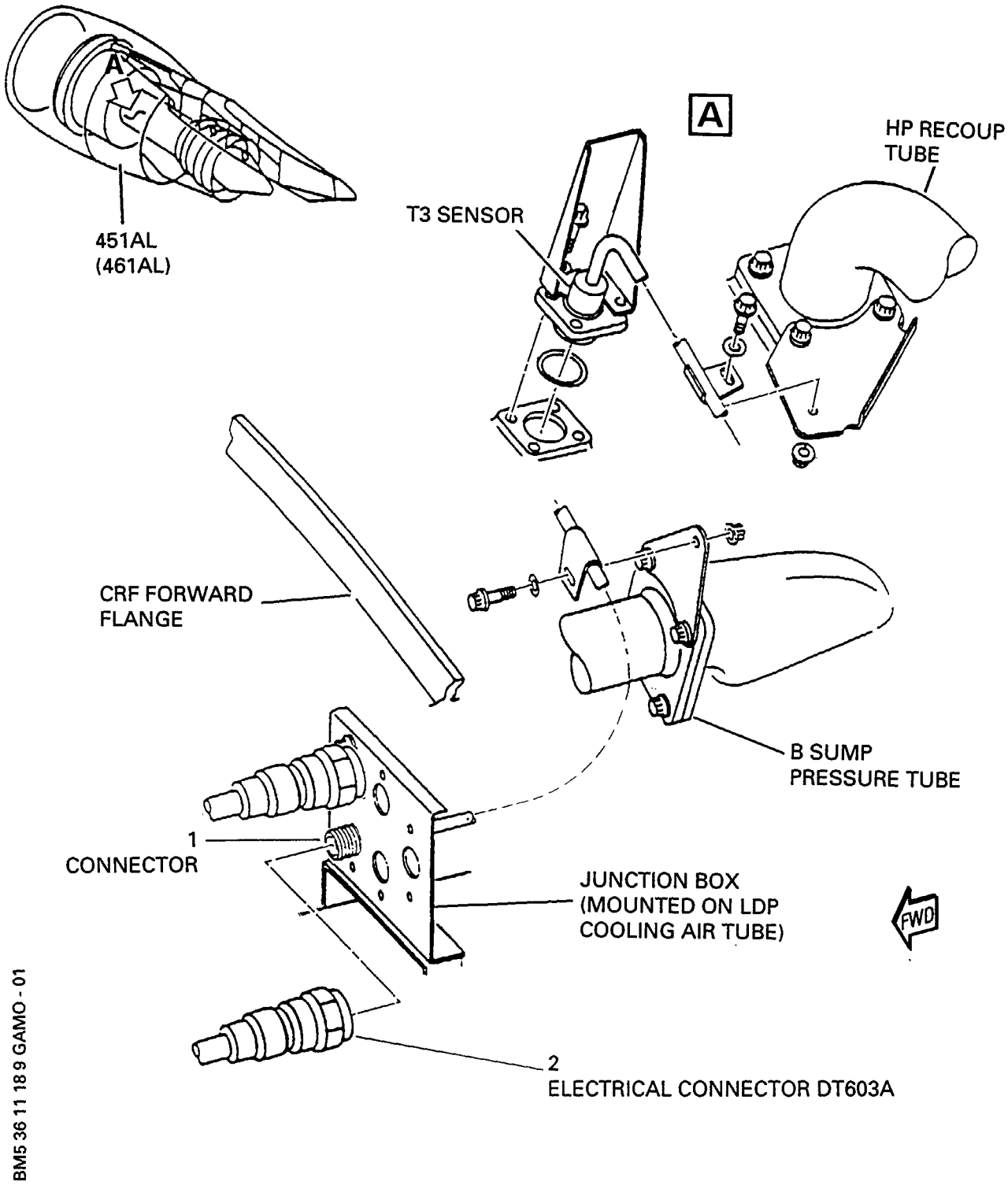
ITEM	DESIGNATION
(1)	Access Platform
(2)	Circuit Breaker Safety Clips
(3)	Warning Notice
(4)	Protective Cap
(5)	Tape
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure
(Ref. Fig. 901)
(Pre GE SB77-005)
(Ref. Fig. 902)
(Post GE SB77-005)

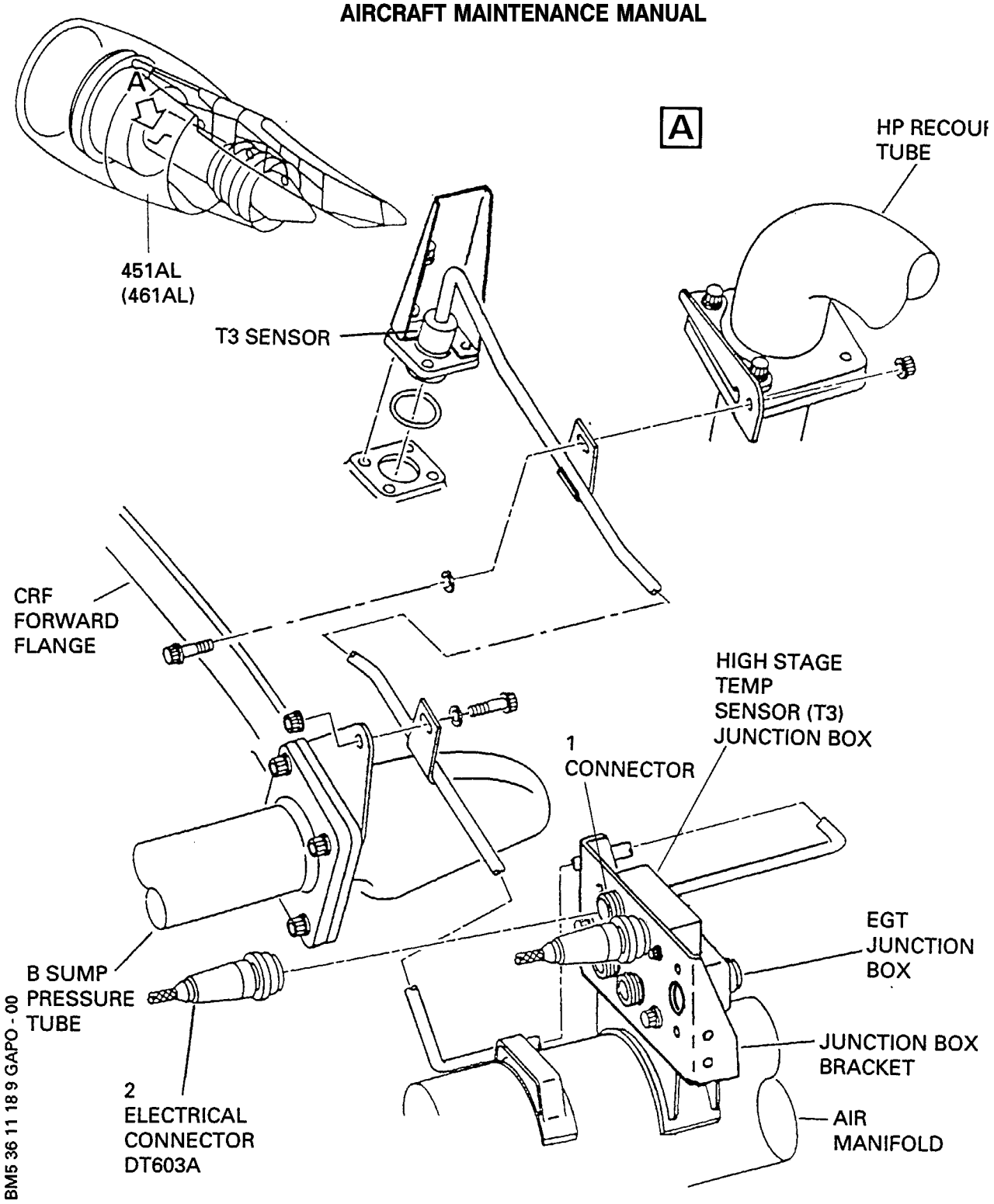
(1)Job set-up
(a)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG1/CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1/CONTROLLER/CTL	7HA	209/A18
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/MONITOR	6HA	315/D54

(a)On AIR BLEED section of panel 436VU, place ENG1(2) HP VALVE pushbutton switch in OFF position.
(b)Open LH thrust reverser door (Ref. 71-13-00, P. Block 301).
(c)Install access platform.
(2)Removal
(a)Disconnect electrical connector DT603A (2).
(b)Install protective cap on electrical connector (2).
(c)Stow electrical cable and connector and secure with tape.
(3)Close-up
(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(b)Remove access platform.
(c)Close left thrust reverser door (Ref. 71-13-00, P. Block 301).



High Stage Temperature Sensor (T3)
Figure 901



High Stage Temperature Sensor (T3)
Figure 902

(d)Remove safety clips and tags and close circuit breakers 5HA and 7HA (6HA and 8HA).
(e)Install a temporary warning notice in flight compartment to tell persons that High Stage Temperature Sensor is deactivated.

2. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
(1)	Access Platform
(2)	Circuit Breaker Safety Clips
Referenced Procedure - 71-13-00, P. Block 301	Cowl Doors

B. Procedure

(Ref. Fig. 901) or
(Ref. Fig. 902)

(1)Job set-up

(a)Open, safety and tag the following circuit breakers for the appropriate engine :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG1/CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1/CONTROLLER/CTL	7HA	209/A18
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/MONITOR	6HA	315/D54

(b)Open left thrust reverser door (Ref. 71-13-00, P. Block 301).

(c)Install access platform.

(2)Installation

(a)Remove tape securing electrical cable and connector.

(b)Remove protective cap from electrical connector (2).

(c)Connect electrical connector DT603A (2) on T3 connector (1).

(d)Remove safety clips and tags and close circuit breakers 5HA and 7HA (6HA and 8HA).

(e)Troubleshoot the system (Ref. TSM Chapter 36-11).

(3)Close-up

(a)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(b)Remove access platform.

(c)Close left thrust reverser door (Ref. 71-13-00, P. Block 301).

(d)Remove the temporary warning notice in flight compartment.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Circuit Breaker Safety Clips
Referenced Procedure - 36-11-00, P. Block 501	Engine Bleed Air Supply System

2. Procedure

**ON A/C 001-005, 101-101, 105-105,

(Ref. Fig. 401)

R **ON A/C ALL

R Post SB 36-2027 For A/C 001-005,101-101,105-105,

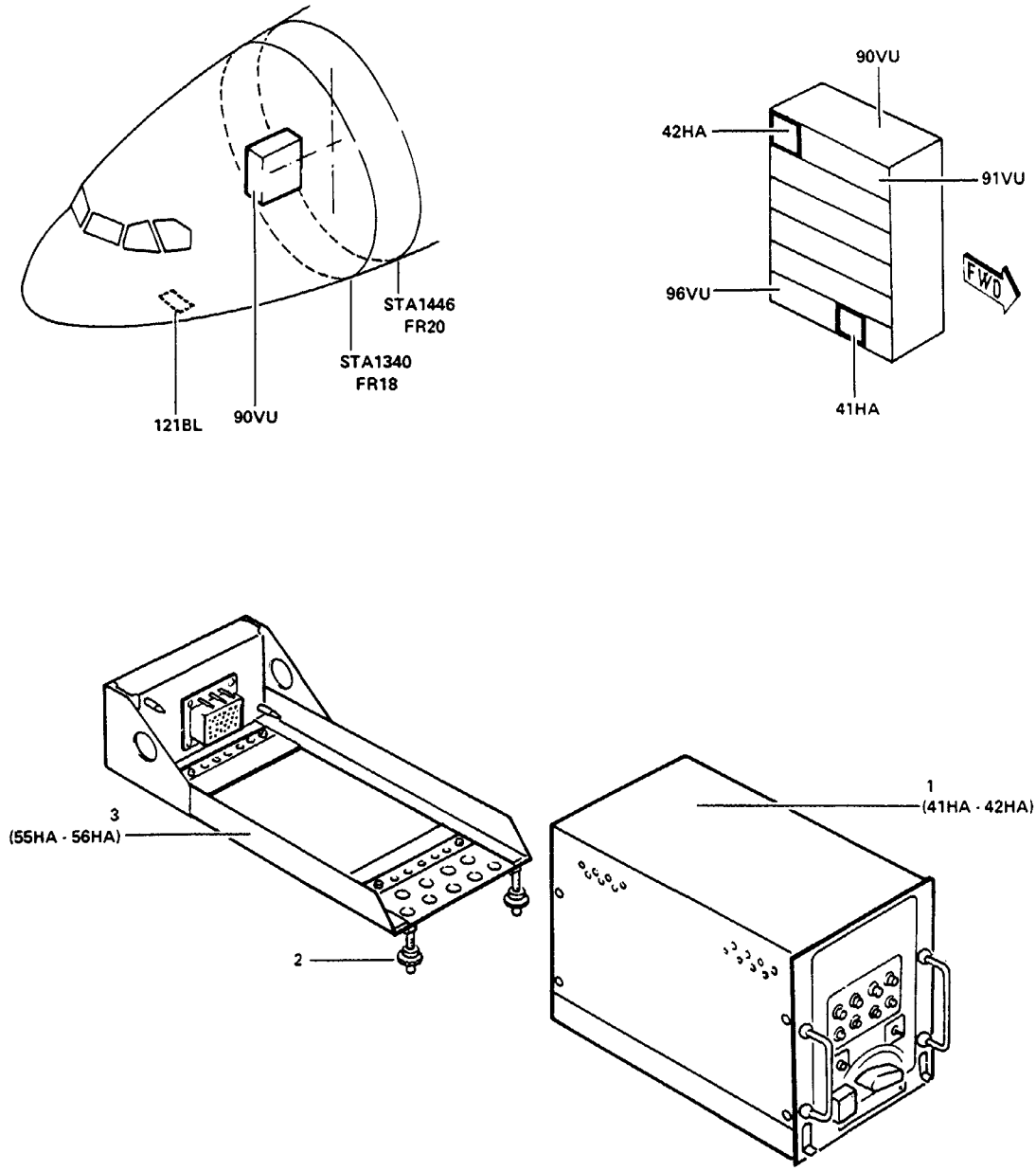
(Ref. Fig. 402)

**ON A/C ALL

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers :

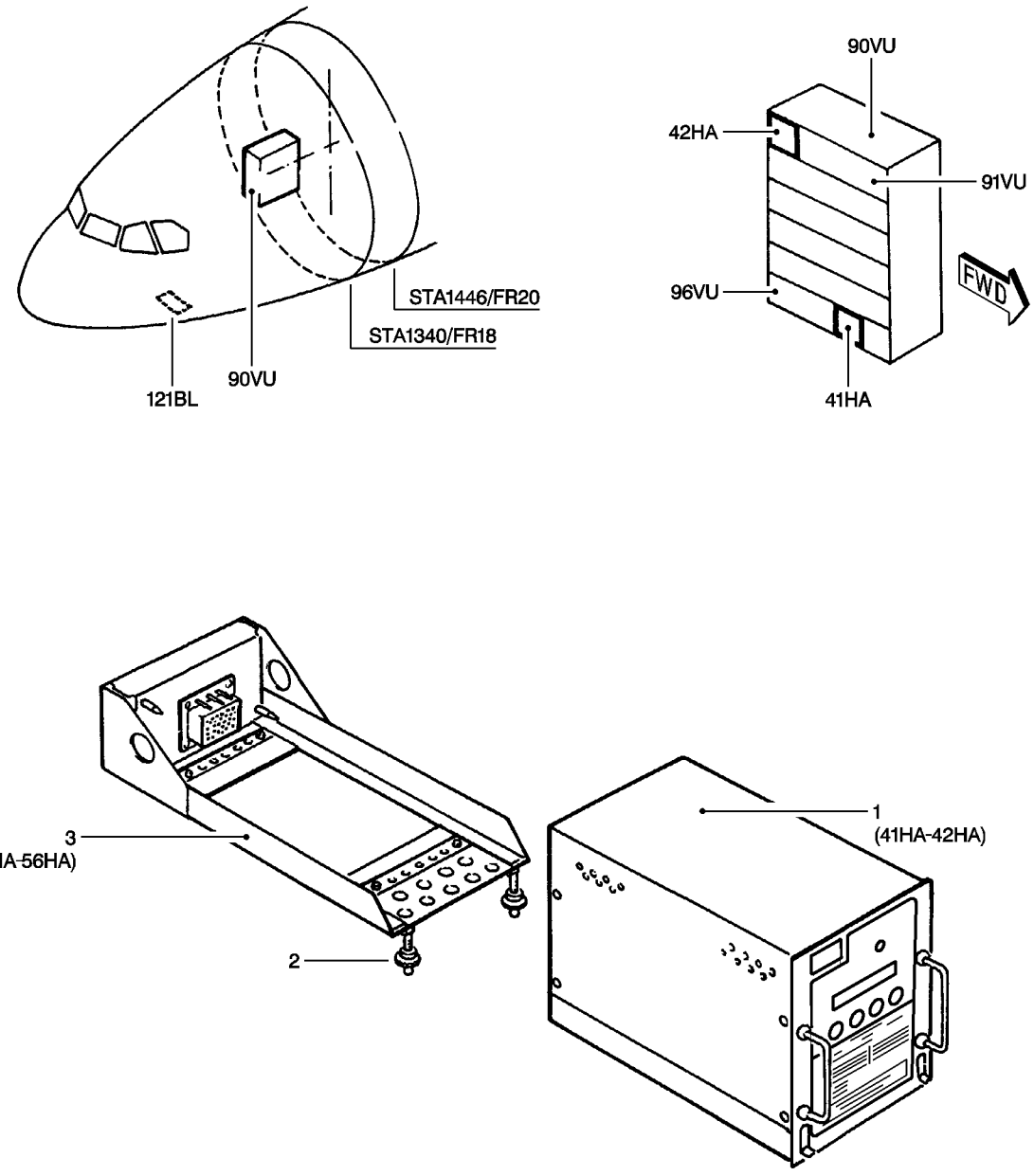
PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG 1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG 1 CONTROLLER/CTL	7HA	209/A18
22VU	AIR BLEED/ENG 1 WARN	9HA	203/G15
131VU	AIR BLEED & COMPT TEMP/ENG1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/VALVES/ENG1 VALVES/BLEED	11HA	311/H54
131VU	AIR BLEED & COMPT TEMP/ENG2/VALVES/ BLEED	12HA	311/H55
131VU	AIR BLEED & COMPT TEMP/ENG2/VALVES/HP	4HA	312/G53
131VU	AIR BLEED & COMPT TEMP/ENG2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/ CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER	6HA	315/D54

(2)Position access platform.
(3)Open access door 121BL to avionics compartment.
(4)For pneumatic controller 41HA only :
- remove side panel of shelf 96VU (Minimum equipment bay) in which it is located.



BM5 36 11 19 4 AAMO - 13 - 07
DM5

Pneumatic Controller
Figure 401



BM5 36 11 19 4 AAN0 00

Pneumatic Controller
Figure 402

B. Removal
(1)Unscrew knurled nuts (2).
(2)Ease pneumatic controller (1) out of its support (3) with care.
(3)Clean and inspect controller interface and/or adjacent area.

R **ON A/C 001-005, 101-101, 105-105,

R C. Installation
R (1)Position controller (1) on support (3) and carefully plug in.
R (2)Secure controller (1) by means of knurled nuts (2).
R (3)Perform controller reset (BITE switch must be placed in position 1,
R held for 3 seconds, then returned to FLIGHT position).

R **ON A/C ALL

R Post SB 36-2027 For A/C 001-005,101-101,105-105,

R Post SB 36-2033 For A/C 001-005,105-105,

R C. Installation
R (1)Position controller (1) on support (3) and carefully plug in.
R (2)Secure controller (1) by means of knurled nuts (2).
R (3)Perform controller reset :
R - Press SCROLL switch and wait until CURRENT FLIGHT message is displayed.
R - Press SCROLL switch until CLEAR ALL FAULTS message is displayed.
R - Press CLEAR MEMORY switch to display CLR ALL FAULTS ? message.
R - Press CLEAR MEMORY and SELECT switches simultaneously to erase all
R faults (CURRENT FLIGHT message appears).

R **ON A/C ALL

R D. Test
R (1)Perform BITE test (Ref. 36-11-00, P. Block 501).

R E. Close-Up
R (1)Make certain that working area is clean and clear of tools and miscella-
R neous items of equipment.
R (2)For pneumatic controller 41HA only :
R - Install side panel of shelf 96VU.
R (3)Close access door 121BL.
R (4)Remove access platform.
R (5)Remove safety clips and tags and close circuit breakers 5HA, 7HA, 9HA,
R 3HA and 11HA (12HA, 6HA, 8HA, 4HA and 10HA).

TEMPERATURE CONTROL SENSOR (53HA, 54HA) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM:
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.
- DISPLAY WARNING NOTICE ON GROUND POWER CONNECTIONS PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.
- DISPLAY WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED LOAD VALVE CONTROL SWITCH PLACED IN "CLOSE RESET" POSITION.
- DISPLAY WARNING NOTICE PROHIBITING OPERATION OF THE ENGINES.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
B.	Protective Cap
C.	Blank for Adapter Orifice (0.8750 - 14 UNJF)
D.	Circuit Breaker Safety Clips and Tags
E.	O-Ring
F.	Lockwire, Corrosion-Resistant Steel, Dia. 0.6 mm (0.02 in.)

Referenced Procedure	
- 36-11-00, P. Block 501	Engine Bleed Air Supply System

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED - COMPT TEMP/ENG1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED - COMPT TEMP/ENG2/VALVES/HP	4HA	312/G53
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/ MONITOR	6HA	315/D54

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18

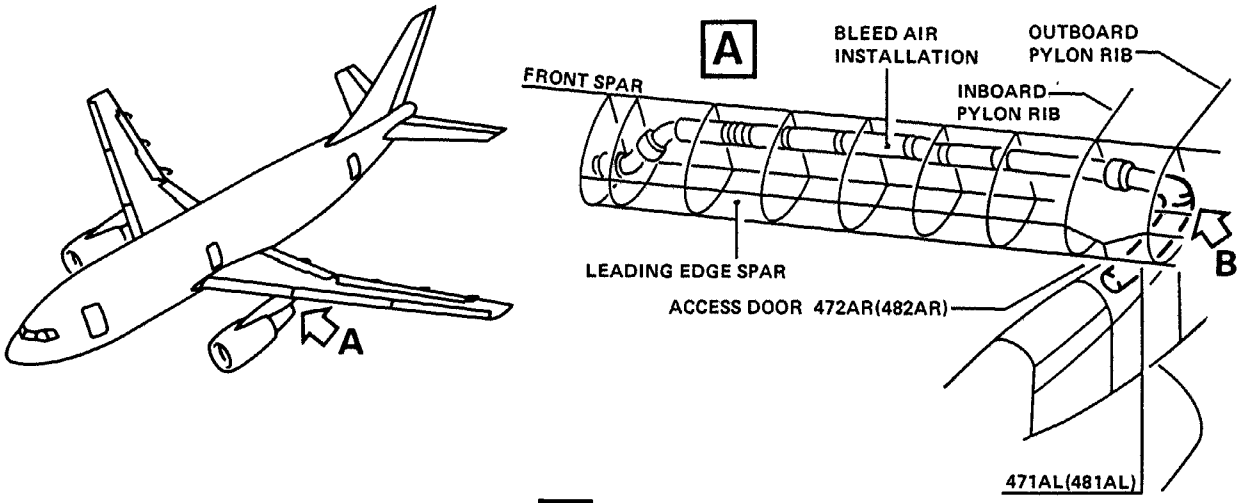
R (2)Position access platform to zone 471 (482).

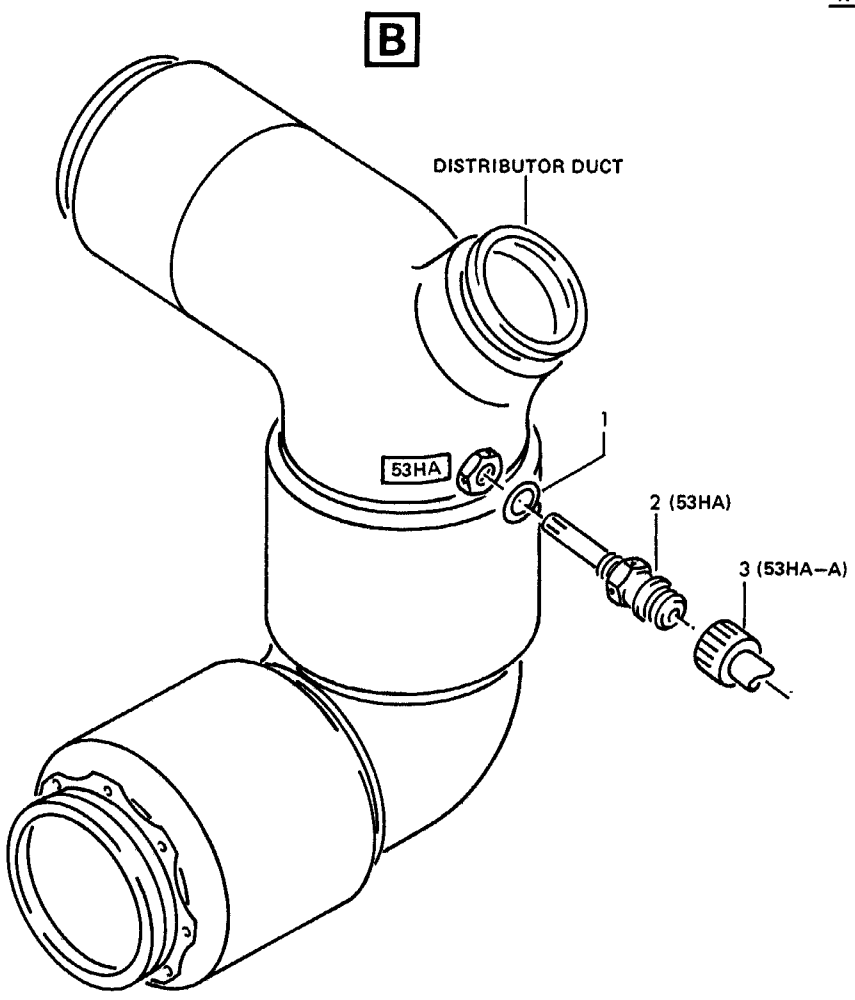
R (3)Open access door 471AL (482AR).

B. Removal

(Ref. Fig. 401)

(1)Disconnect electrical connector 53HA-A (54HA-A) (3) and install





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Temperature Control Sensor 53HA (54HA)
Figure 401

protective cap.
(2)Remove lockwire from temperature control sensor 53HA (54HA) (2).
(3)Remove temperature control sensor (2) 53HA (54HA) with O-ring (1).
Discard O-ring.
(4)Install blank at duct adapter orifice.

C. Installation
(1)Install new O-ring (1) on temperature control sensor (2) 53HA (54HA).
(2)Remove blank from duct adapter orifice.
(3)Install temperature control sensor (2) 53HA (54HA) in duct adapter.
(4)TORQUE to between 0.3 and 4.2 m.daN (2.21 and 30.98 lbf.ft.).
(5)Secure temperature control sensor 53HA (54HA) with lockwire.
(6)Remove protective caps and connect electrical connector (3) 53HA-A (54HA-A).
(7)Check for sufficient clearance between electrical connector (3) and the fuel line.
(8)Remove safety clips and tags and close circuit breakers 3HA, 4HA, 5HA, 6HA, 7HA and 8HA.

D. Test
(1)Perform operational test (BITE Test using test selector switch) on pneumatic system controller 41HA (42HA) (Ref. 36-11-00, P. Block 501).

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
R (2)Close access door 471AL (482AR).
(3)Remove access platform.

REGULATOR PRESSURE SENSOR 49HA (50HA) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM:
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.
- PLACE A WARNING NOTICE ON THE GROUND POWER CONNECTIONS PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.
- PLACE A WARNING NOTICE PROHIBITING OPERATION OF THE ENGINES.
- PLACE A WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED LOAD VALVE CONTROL SWITCH PLACED IN "CLOSE RESET" POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 6 m (20 ft.)
B.	Warning Notices Prohibiting Operation of Engine Bleed Air Supply System
C.	Warning Notices Prohibiting Operation of Slats
D.	Blanking Plug/Cap
E.	Ring
F.	O-Ring
G.	Circuit Breaker Safety Clips and Tags
H. Material No. 04-004	Common Greases (Ref. 20-31-00)

Referenced Procedures

- 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 36-11-00, P. Block 501	Engine Bleed Air Supply System

2. Procedure

(Ref. Fig. 401)

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/LAND RECOVERY SUPPLY/	9CV	335/R66

PANEL	SERVICE	IDENT.	LOCATION
	SLATS/SYS 1		
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL SLATS 26 VAC/SYS 2	4CV	335/R64
131VU	AIR BLEED ! COMPT TEMP/VALVES/ENG1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED ! COMPT TEMP/ENG2 VALVES/HP	4HA	312/G53
131VU	AIR BLEED ! COMPT TEMP/ENG2/CONTROLLER/ MONITOR	6HA	315/D54
131VU	AIR BLEED ! COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED ! COMPT TEMP/ENG2/WARN	10HA	312/G54
131VU	AIR BLEED ! COMPT TEMP/VALVES/ENG1 VALVES/BLEED	11HA	311/H54
131VU	AIR BLEED ! COMPT TEMP/ENG2/VALVES/BLEED	12HA	311/H55
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18
22VU	AIR BLEED/ENG1 WARN	9HA	209/G15

(2)Display warning notices prohibiting operation of engine bleed air supply system.
(3)Position access platform under wing near pylon area.
(4)Open access panel 416AR (426AR).

B. Removal

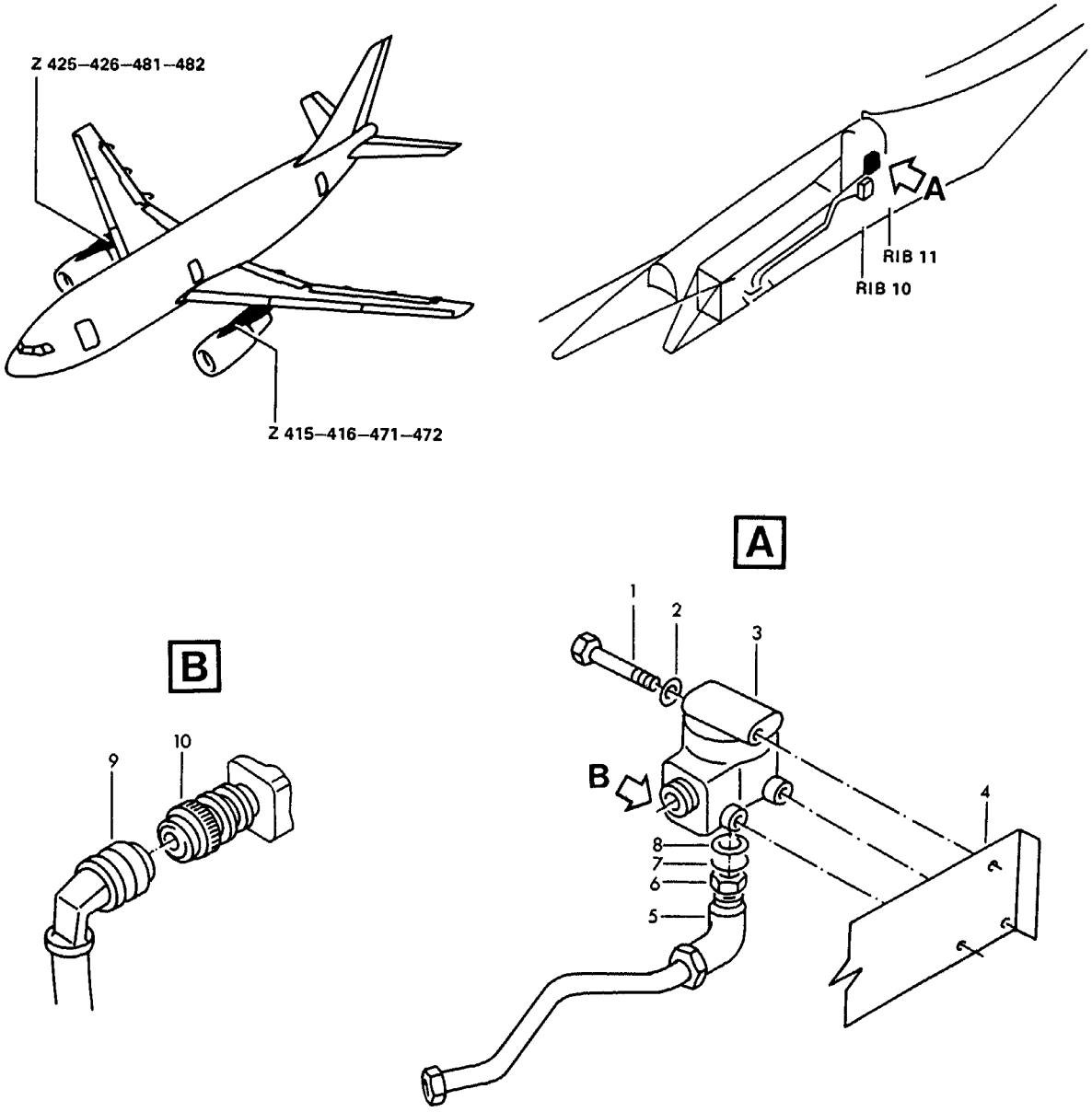
(1)Disconnect electrical connector (9) from socket (10).
R (2)Unscrew and disconnect coupling nut (6) from regulator pressure sensor 49HA (50HA) (3).
(3)Support regulator pressure sensor 49HA (50HA) (3) and remove bolts (1) and washers (2).
(4)Remove regulator pressure sensor 49HA (50HA) (3) from bracket (4).
(5)Unscrew coupling nut (6) from elbow fitting (5), remove and discard packing washer (7) and O-ring (8).
R (6)Install protective cover on elbow fitting (5) and electrical connector (9).

C. Preparation of Replacement Component

R (1)Check that the seven drain/ambient sensing ports located on the body
R of regulator pressure sensor are clean and free from foreign matter.
R (2)Remove protective cover from elbow fitting (5).
(3)Coat packing washer (7), O-ring (8) and thread of the elbow fitting (5) with synthetic grease (Material No. 04-004).
(4)Install coupling nut (6), packing washer (7) and O-ring (8) to elbow fitting (5).

D. Installation

(1)Position regulator pressure sensor 49HA (50HA) (3) with washers (2) and bolts (1) to bracket (4).
(2)Connect elbow fitting (5) to sensor inlet fitting with coupling nut (6).
(3)Turn coupling nut (6) until packing washer (7) and O-ring (8) contacts



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Regulator Pressure Sensor 49HA (50HA)
Figure 401

sensor surface.

(4)Tighten bolts (1).

(5)Tighten coupling nut (6).

R (6)Remove protective cover from electrical connector (9) and connect
R electrical connector (9) to socket (10). Tighten connectors plus
R one-eighth turn.

(7)Remove safety clips and tags and close circuit breakers 3HA, 4HA, 6HA, 8HA, 10HA, 12HA, 5HA, 7HA and 9HA.

E. Test

(1)Perform BITE TEST with test pushbutton switch on pneumatic system controller 41HA (42HA) (Ref. 36-11-00, P. Block 501, Operational Test).

F. Close-Up

(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.

(2)Close access panel 416AR (426AR).

(3)Remove access platform.

(4)Remove warning notices.

(5)Remove safety clips and tags and close circuit breakers 7CV, 8CV, 4CV, 3CV and 9CV.

HIGH STAGE PRESSURE SENSOR 47HA (48HA) - REMOVAL/INSTALLATION

WARNING : CHECK THAT THE LANDING GEAR GROUND SAFETIES INCLUDING WHEEL CHOCKS ARE IN POSITION.

R WARNING : BEFORE APPLYING OR RELIEVING HYDRAULIC SYSTEM PRESSURE, MAKE CERTAIN THAT THE TRAVEL RANGES OF THE CONTROL SURFACES ARE CLEAR.

R WARNING : BEFORE PRESSURIZING HYDRAULIC SYSTEMS, CHECK THAT ALL CONTROLS ARE SET TO CORRESPOND WITH THE ACTUAL POSITION OF THE SERVICES THEY OPERATE.

R WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM:
- MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.
- PLACE A WARNING NOTICE ON THE GROUND POWER CONNECTIONS PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.
- PLACE A WARNING NOTICE PROHIBITING OPERATION OF THE ENGINES.
- PLACE A WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED LOAD VALVE CONTROL SWITCH PLACED IN "CLOSE RESET" POSITION.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 6 m (20 ft.)
B.	Warning Notices Prohibiting Operation of Engine Bleed Air Supply System
C.	Warning Notices Prohibiting Operation of Slats
D.	Blanking Plug/Cap
E.	Ring
F.	O-Ring
G.	Circuit Breaker Safety Clips and Tags
H. Material No. 04-004	Common Greases (Ref. 20-31-00)
Referenced Procedure	
R - 27-80-00, P. Block 301	Lift Augmenting (Slats and Krueger Flaps)
- 36-11-00, P. Block 501	Engine Bleed Air Supply System

2. Procedure
(Ref. Fig. 401)

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

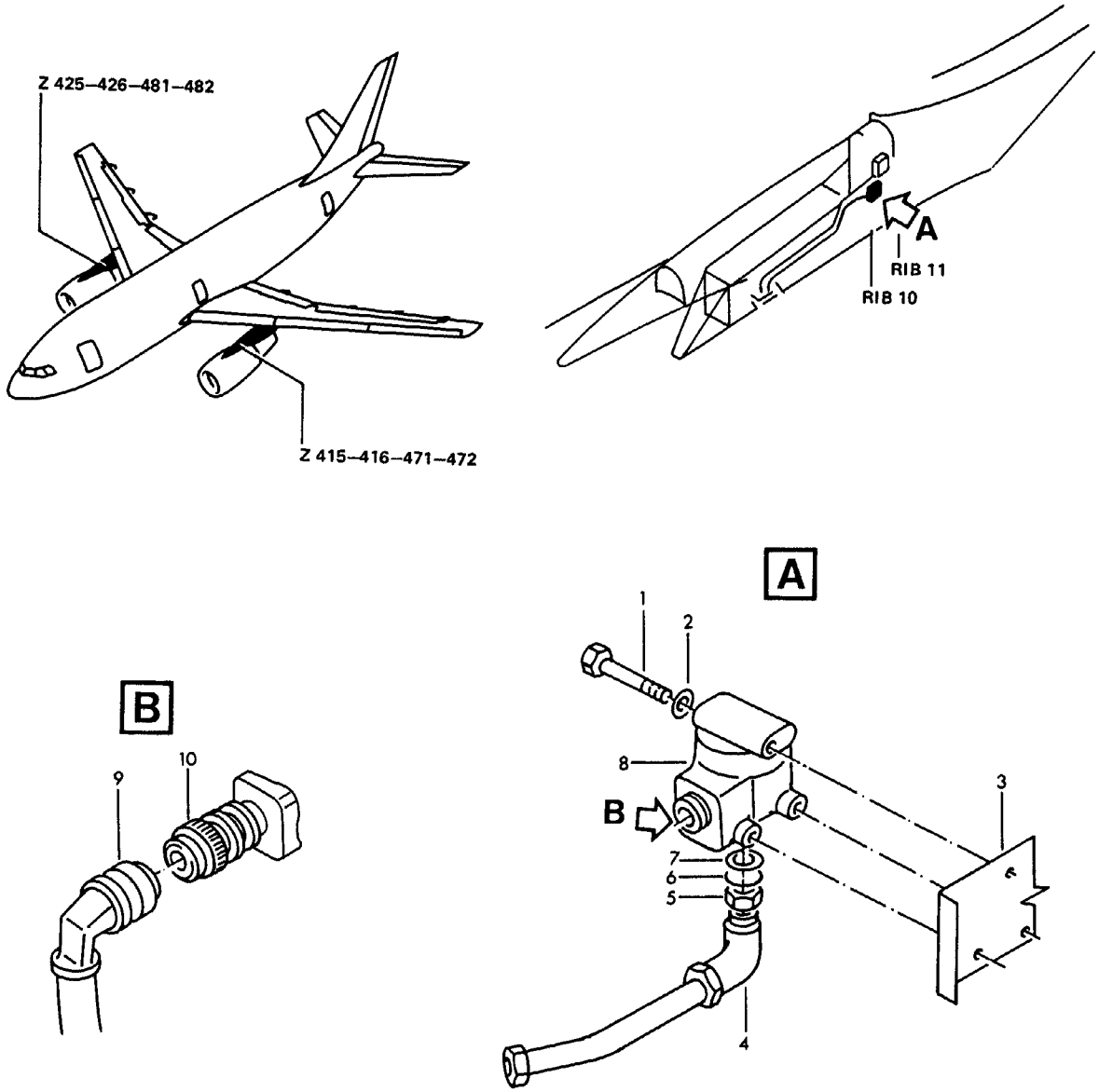
PANEL	SERVICE	IDENT.	LOCATION
133VU	FLT CTL/SLATS/26 VAC/SYS 1	3CV	335/R65
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 1	7CV	333/T63
133VU	FLT CTL/SFCC/LAND RECOVERY SUPPLY/ SLATS/SYS 1	9CV	335/R66
133VU	FLT CTL/SFCC/NORM SUPPLY/SLATS/SYS 2	8CV	333/T64
133VU	FLT CTL SLATS 26 VAC/SYS 2	4CV	335/R64
131VU	AIR BLEED & COMPT TEMP/VALVES/ENG1 VALVES/HP	3HA	311/H53
131VU	AIR BLEED & COMPT TEMP/ENG2 VALVES/HP	4HA	312/G53
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/ MONITOR	6HA	315/D54
131VU	AIR BLEED & COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED & COMPT TEMP/ENG2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/VALVES/ENG1 VALVES/BLEED	11HA	311/H54
131VU	AIR BLEED & COMPT TEMP/ENG2/VALVES/BLEED	12HA	311/H55
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18
22VU	AIR BLEED/ENG1 WARN	9HA	209/G15

(2)Display warning notices prohibiting operation of engine bleed air supply system.
(3)Position access platform under wing near pylon area.
(4)Open access panel 416AR (426AR).

**ON A/C 001-005, 101-101, 105-105,

B. Removal
(1)Disconnect electrical connector (9) from socket (10).
(2)Unscrew and disconnect coupling nut (5) from high stage pressure sensor 47HA (48HA) (8).
(3)Support high stage pressure sensor 47HA (48HA) (8) and remove bolts (1) and washers (2).
(4)Remove high stage pressure sensor 47HA (48HA) (8) from bracket (3).
(5)Unscrew coupling nut (5) from elbow fitting (4), remove and discard packing washer (6) and O-ring (7).
R (6)Install protective cover on elbow fitting (4) and electrical connector (9).

C. Preparation of Replacement Component
R (1)Check that the seven drain/ambient sensing ports located on the body
R of regulator pressure sensor are clean and free from foreign matter.
R (2)Remove protective cover from elbow fitting (4).



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High Stage Pressure Sensor 47HA (48HA)
Figure 401

(3)Coat packing washer (6), O-ring (7) and thread of the elbow fitting (4) with synthetic grease (Material No. 04-004).
(4)Install coupling nut (5), packing washer (6) and O-ring (7) to elbow fitting (4).

D. Installation
(1)Position high stage pressure sensor 47HA (48HA) (8) with washers (2) and bolts (1) to bracket (3).
(2)Connect elbow fitting (4) to sensor inlet fitting with coupling nut (5).
(3)Turn coupling nut (5) until packing washer (6) and O-ring (7) contacts sensor surface.
(4)Tighten bolt
(5)Tighten coupling nut (5).
R (6)Remove protective cover from electrical connector (9) and connect
R electrical connector (9) to socket (10). Tighten connector plus
R one-eighth turn.
(7)Remove safety clips and tags and close circuit breakers 3HA, 4HA, 6HA, 8HA, 10HA, 11HA, 12HA, 5HA, 7HA and 9HA.

E. Test
(1)Perform BITE TEST with test selector switch on pneumatic system controller 41HA (42HA) at position 9 (Ref. 36-11-00, P. Block 501, Operational Test).

R **ON A/C ALL

R Post SB 36-2027 For A/C 001-005,101-101,105-105,

B. Removal
(1)Disconnect electrical connector (9) from socket (10).
(2)Unscrew and disconnect coupling nut (5) from high stage pressure sensor 47HA (48HA) (8).
(3)Support high stage pressure sensor 47HA (48HA) (8) and remove bolts (1) and washers (2).
(4)Remove high stage pressure sensor 47HA (48HA) (8) from bracket (3).
(5)Unscrew coupling nut (5) from elbow fitting (4), remove and discard packing washer (6) and O-ring (7).
R (6)Install protective cover on elbow fitting (4) and electrical connector (9).

C. Preparation of Replacement Component
R (1)Check that the seven drain/ambient sensing ports located on the body
R of regulator pressure sensor are clean and free from foreign matter.
R (2)Remove protective cover from elbow fitting (4).
(3)Coat packing washer (6), O-ring (7) and thread of the elbow fitting (4) with synthetic grease (Material No. 04-004).
(4)Install coupling nut (5), packing washer (6) and O-ring (7) to elbow

fitting (4).

D. Installation
(1)Position high stage pressure sensor 47HA (48HA) (8) with washers (2) and bolts (1) to bracket (3).
(2)Connect elbow fitting (4) to sensor inlet fitting with coupling nut (5).
(3)Turn coupling nut (5) until packing washer (6) and O-ring (7) contacts sensor surface.
(4)Tighten bolt.
(5)Tighten coupling nut (5).
R (6)Remove protective cover from electrical connector (9) and connect
R electrical connector (9) to socket (10). Tighten connector plus
R one-eighth turn.
(7)Remove safety clips and tags and close circuit breakers 3HA, 4HA, 6HA, 8HA, 10HA, 11HA, 12HA, 5HA, 7HA and 9HA.

E. Test
(1)Perform BITE TEST with test pushbutton switch on pneumatic system controller 41HA (42HA) (Ref. 36-11-00, P. Block 501, Operational Test).

**ON A/C ALL

F. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access panel 416AR (426AR).
(3)Remove access platform.
(4)Remove warning notices.
(5)Remove safety clips and tags and close circuit breakers 3CV, 4CV, 7CV, 8CV and 9CV.

APU BLEED AIR SUPPLY AND CROSSBLEED (CROSSFEED) SYSTEMS DESCRIPTION AND OPERATION

1. General

(Ref. Fig. 003)

The whole system is designed to :

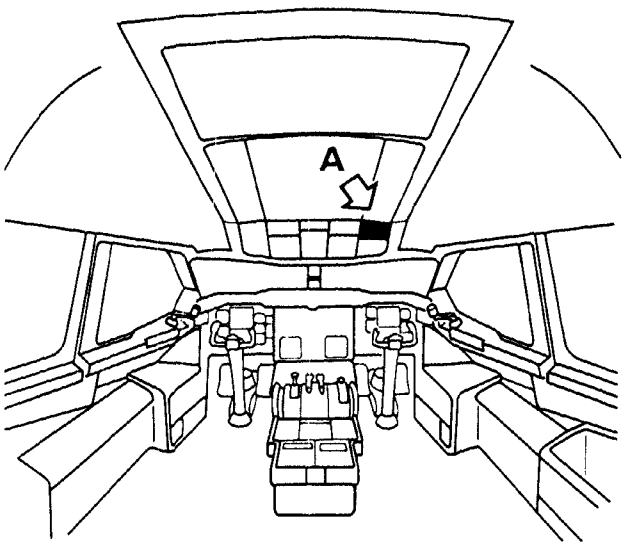
- Supply the air conditioning system and when required the wing ice protection system with air bled from the Auxiliary Power Unit (APU).
- Achieve crossfeed between the left and right air bleeds.
- Start engines with air bled from the APU or start one engine with air bled from the other.
- Pressurize hydraulic reservoirs when left engine air bleed is not available.

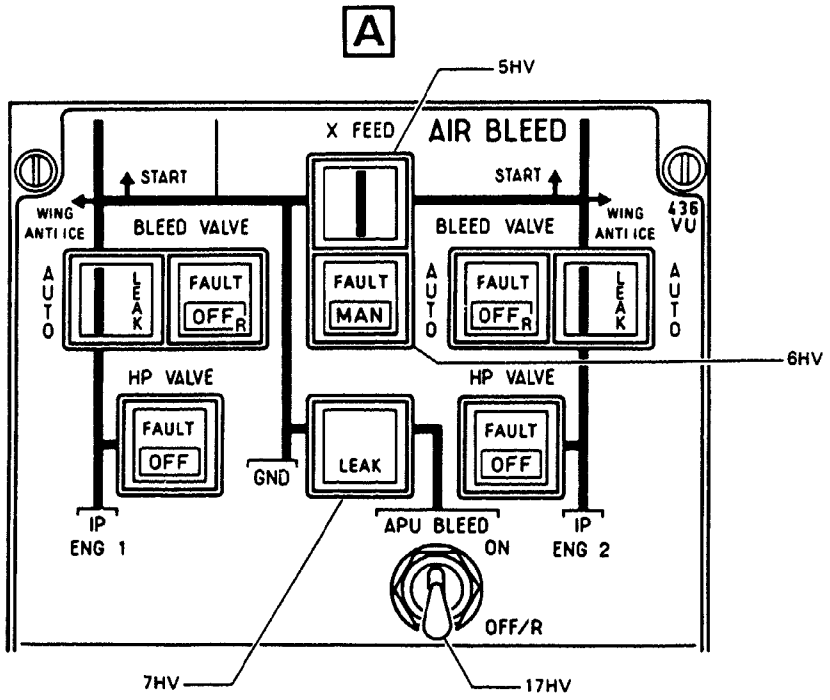
2. Component Location

(Ref. Fig. 001)

(Ref. Fig. 002)

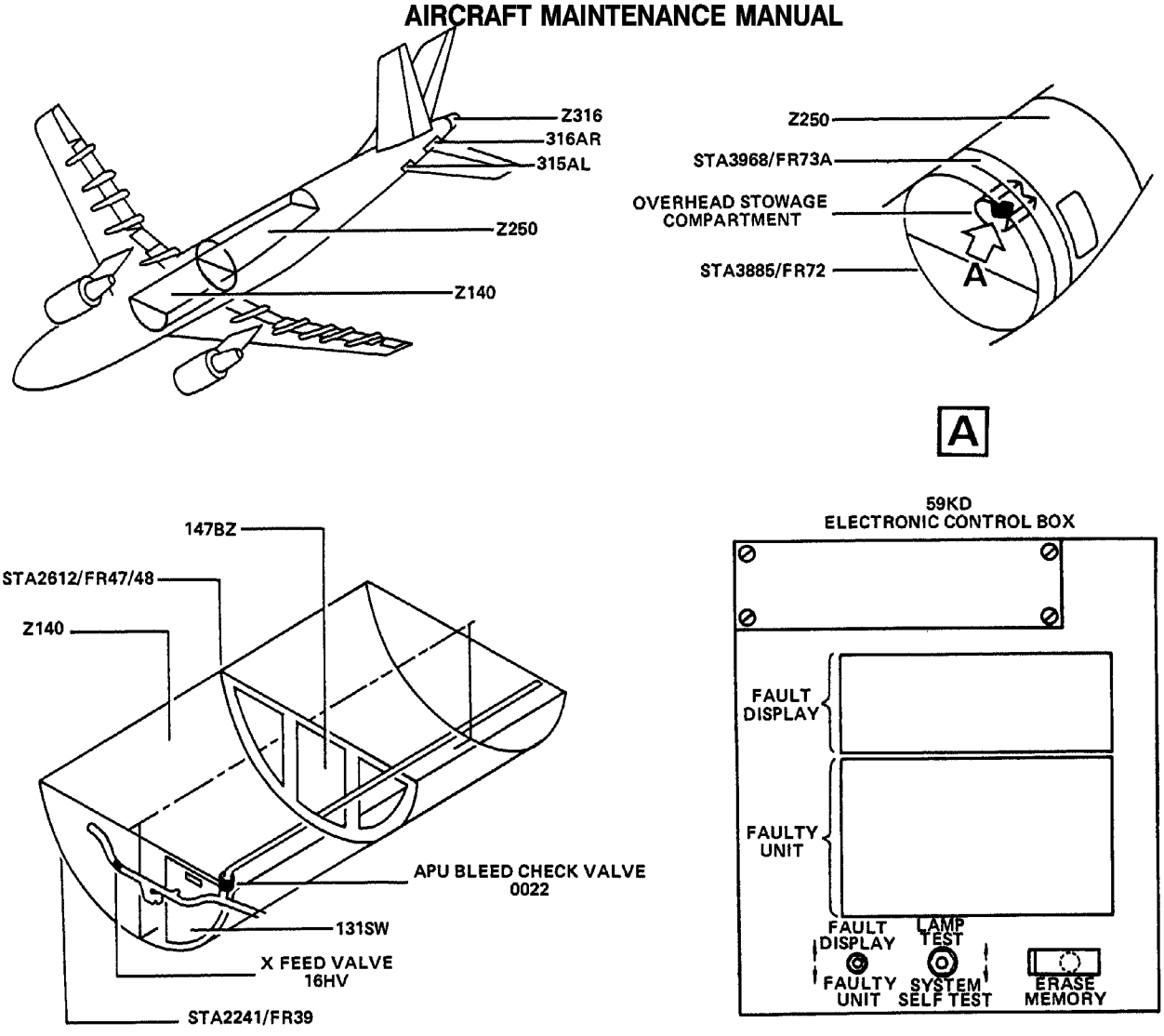
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
5HV	P/BSW-AIR BLEED/X FEED VALVE POSITION	436VU	211		36-12-00
6HV	P/BSW-AIR BLEED/X FEED MODE	436VU	211		36-12-00
7HV	ANNUNCIATOR-AIR BLEED/APU BLEED	436VU	211		36-12-00
16HV	VALVE-CROSSFEED		140	147BZ	36-12-11
17HV	SWITCH-AIR BLEED/APU BLEED	436VU	211		36-12-00
0022	CHECK VALVE-APU BLEED		140	131SW	36-12-12
59KD	CONTROL BOX-ELECTRONIC, APU		250	Overhead Stowage Compartment	49-61-00
66KD	VALVE-APU BLEED LOAD		316	316AR 315AL	49-51-11





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Control and Indicating - Location
Figure 001



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APU Bleed Air - Location in Fuselage
Figure 002

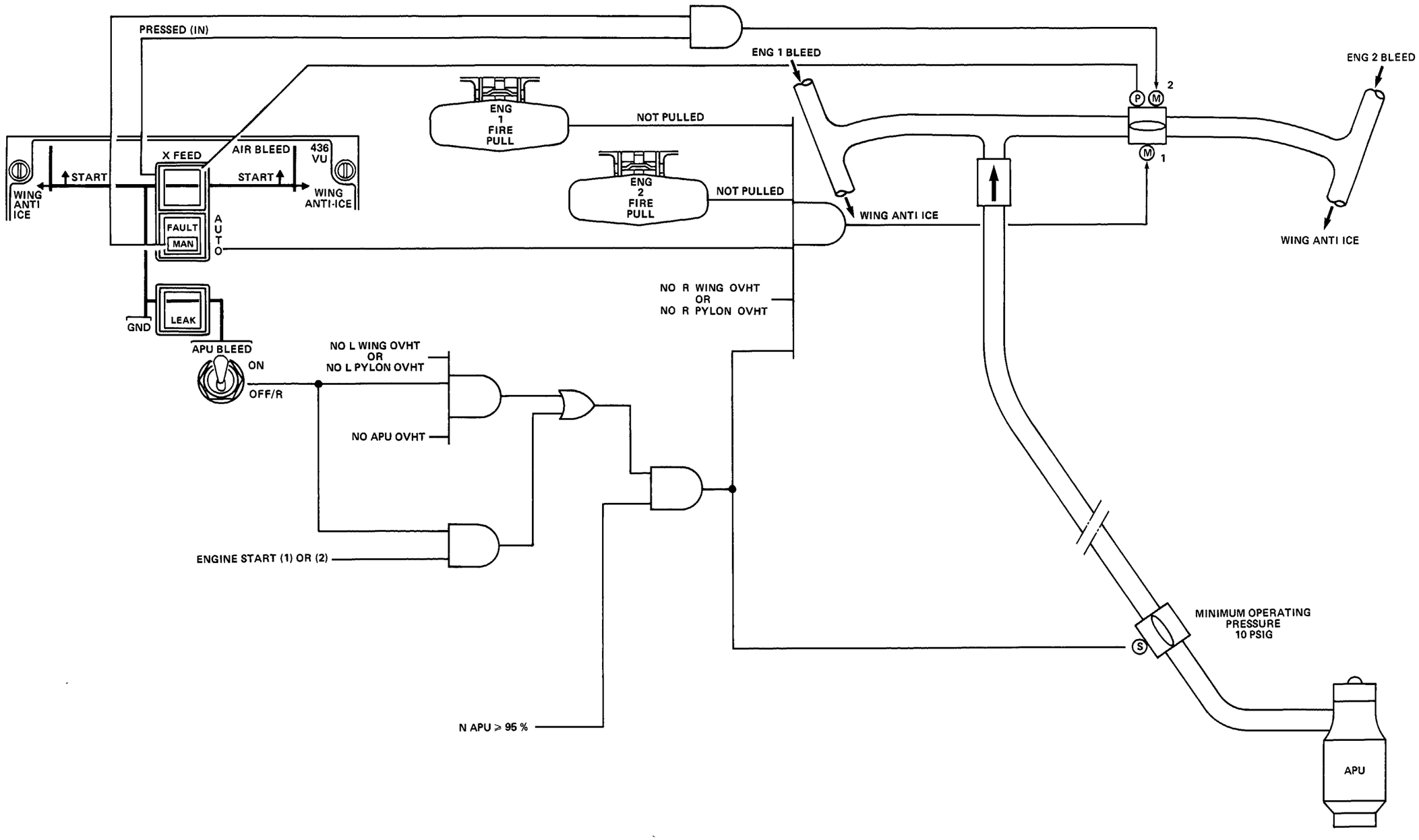
3. APU Bleed Air Supply

A. Description

Air supply from the APU to the previously mentioned systems is performed on the ground and in flight up to a maximum authorized altitude of 20,000 ft. APU air bleed is controlled by a bleed/isolation valve designated APU bleed valve which is an integral part of the APU.
(Ref. Fig. 004, 005)
This is a butterfly shutoff valve pneumatically operated and electrically controlled.
The valve is electrically controlled in open or closed position.
- When the solenoid is energized, upstream air enters the actuator upper chamber and if upstream pressure is sufficient to overcome the spring load, the piston opens the valve butterfly.
- When the solenoid is de-energized, valve control pressure is vented to ambient and the valve is spring-loaded closed.
- In the absence of air pressure, the valve is spring-loaded closed.
  The reverse flow check function is ensured by a thermal sensor.

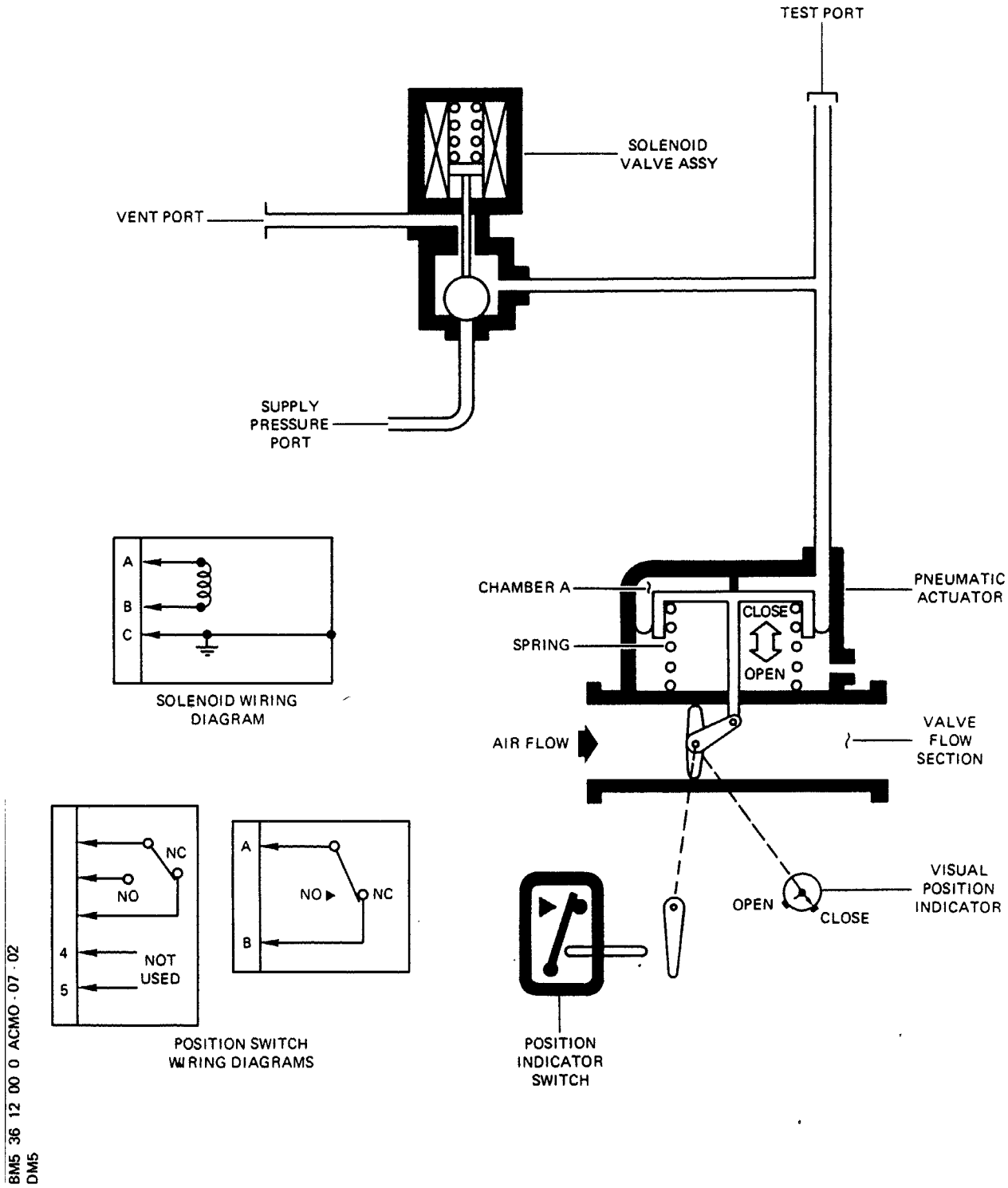
The valve includes an in situ test port.
The valve is automatically controlled to closed position by de-energization of the solenoid in the following cases :
. APU rpm lower than 95%
. reverse flow in APU air bleed ducting sensed by a detection device integrated in the APU system (in this case, the APU is shut down)
. ambient overheat in the vicinity of the duct leading from the APU, in the fuselage, between the APU and the crossfeed system : (illumination of LEAK legend of APU BLEED annunciator).
. ambient overheat in the vicinity of the ducts in the left pylon or left wing : (illumination of LEAK legend of BLEED VALVE/ENG1 annunciator).

A check valve located near the crossfeed duct is designed to protect the APU when air is bled from another supply source.
When APU air bleed is selected, the engine bleed valves are automatically closed and APU output performances are modified and adapted to meet associated air systems requirements (air conditioning, wing ice protection, engine starting).

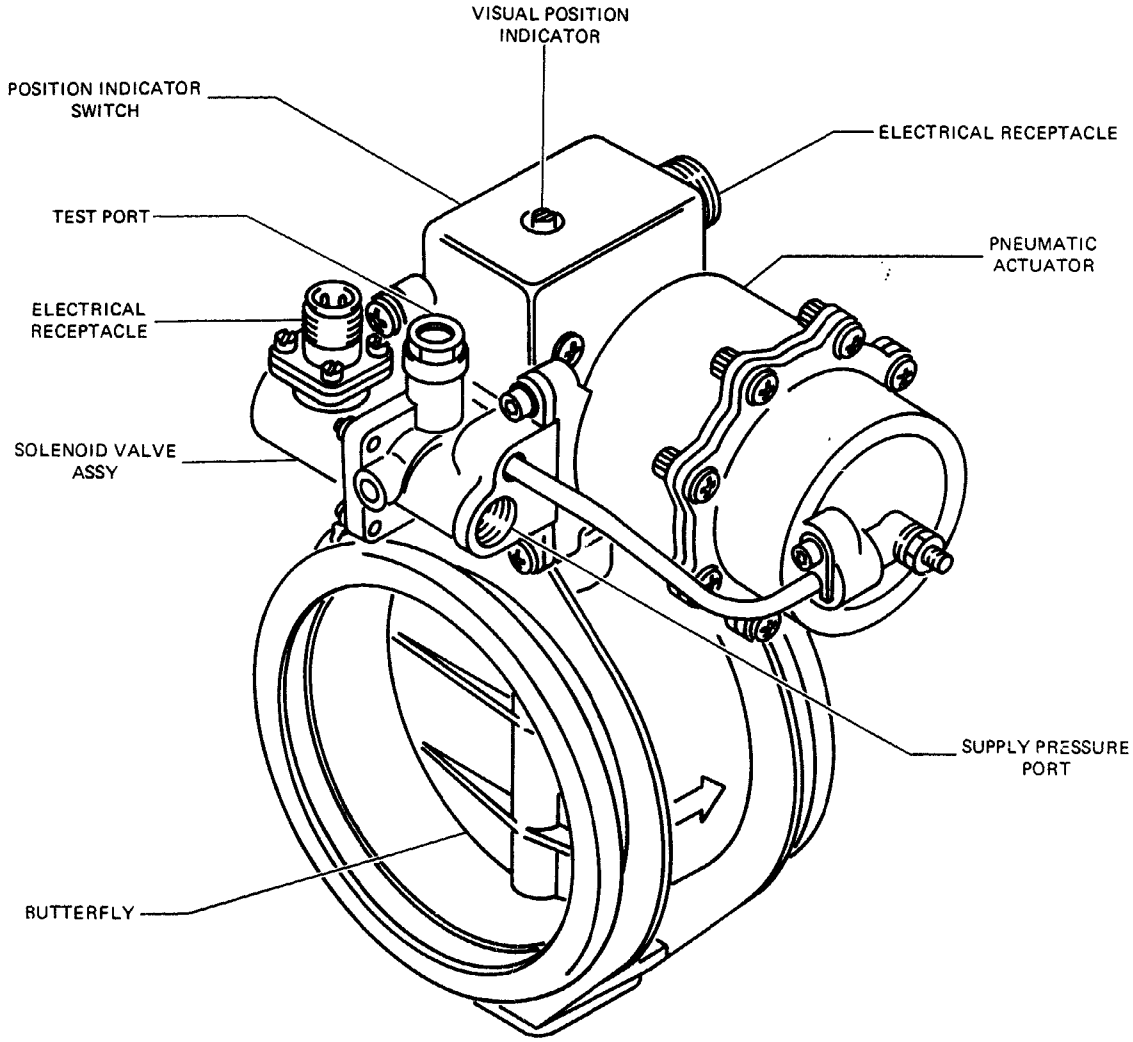


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APU Bleed Air and Crossfeed - Schematic
Figure 003



APU Bleed Valve - Schematic
Figure 004



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APU Bleed Valve - Perspective View
Figure 005

B. Controls and Indicating

**ON A/C 101-200,

(Ref. Fig. 006)

**ON A/C 001-100,

(Ref. Fig. 007)

**ON A/C ALL

APU air bleed is made possible only if APU is operating. APU MASTER switch must therefore be placed in ON position.

(1)APU BLEED switch in ON position

. configuration corresponding to valve automatic opening (solenoid energized).
Valve opening is effective only if APU rpm exceeds 95% or in the absence of reverse flow.
The flowbar of APU BLEED annunciator is on.
The ON position causes :
- the two engine bleed valves to close if their associated pushbutton switches are pressed (in) (AUTO).
- the crossfeed valve to open automatically if associated pushbutton switch is pressed (in) (AUTO) (crossfeed valve, ref. paragraph 4.).

The APU bleed valve and the crossfeed valve will automatically close in the following case :

- with APU BLEED switch in ON position :

R Illumination of LEAK warning legend (left wing overheat, left pylon overheat or APU overheat)

NOTE : Automatic closure of the valves is inhibited during the engine start sequence.

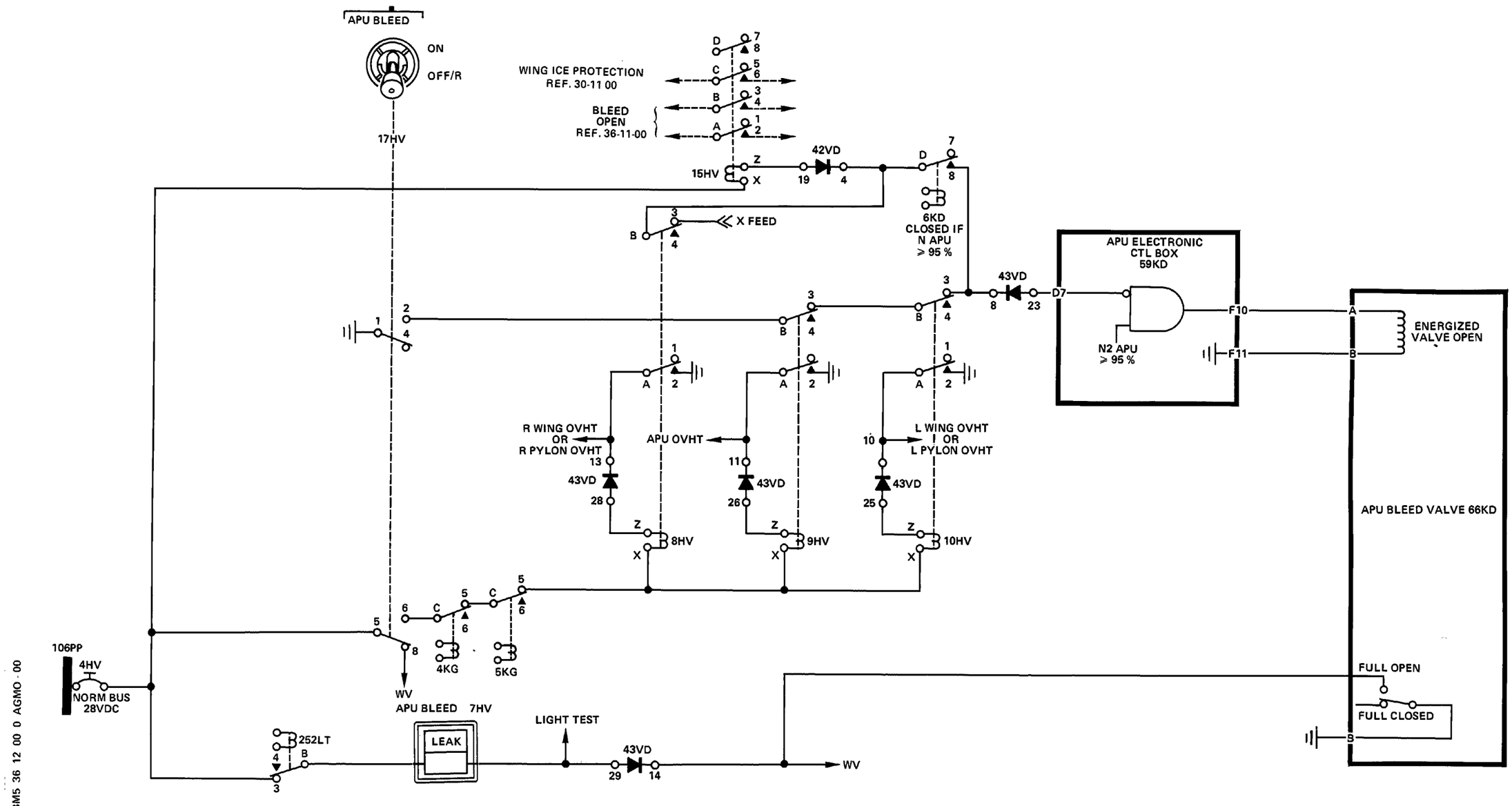
R NOTE : In case of right circuit overheat, only the crossfeed valve
R automatically closes.

(2)APU BLEED switch in OFF/R position

This configuration corresponds to valve closing controlled by de-energization of the solenoid.
This is the normal position of the switch when engine air bleed is selected. The flowbar of APU BLEED annunciator is off.
This position automatically causes :
- the two engine bleed valves to open if their associated pushbutton switches are pressed (in) (AUTO).
- the crossfeed valve to close if associated pushbutton switch is pressed (in) (AUTO).

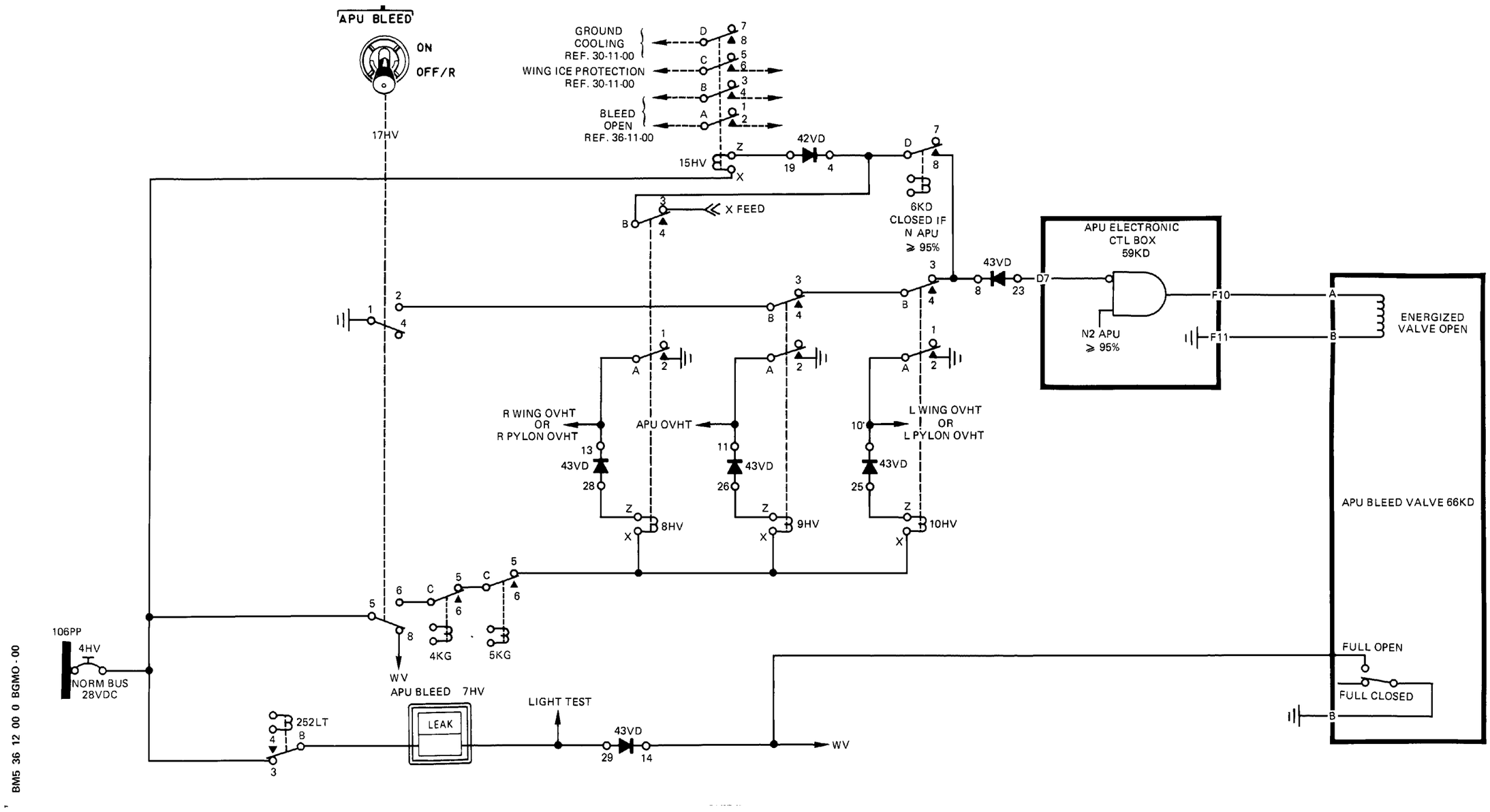
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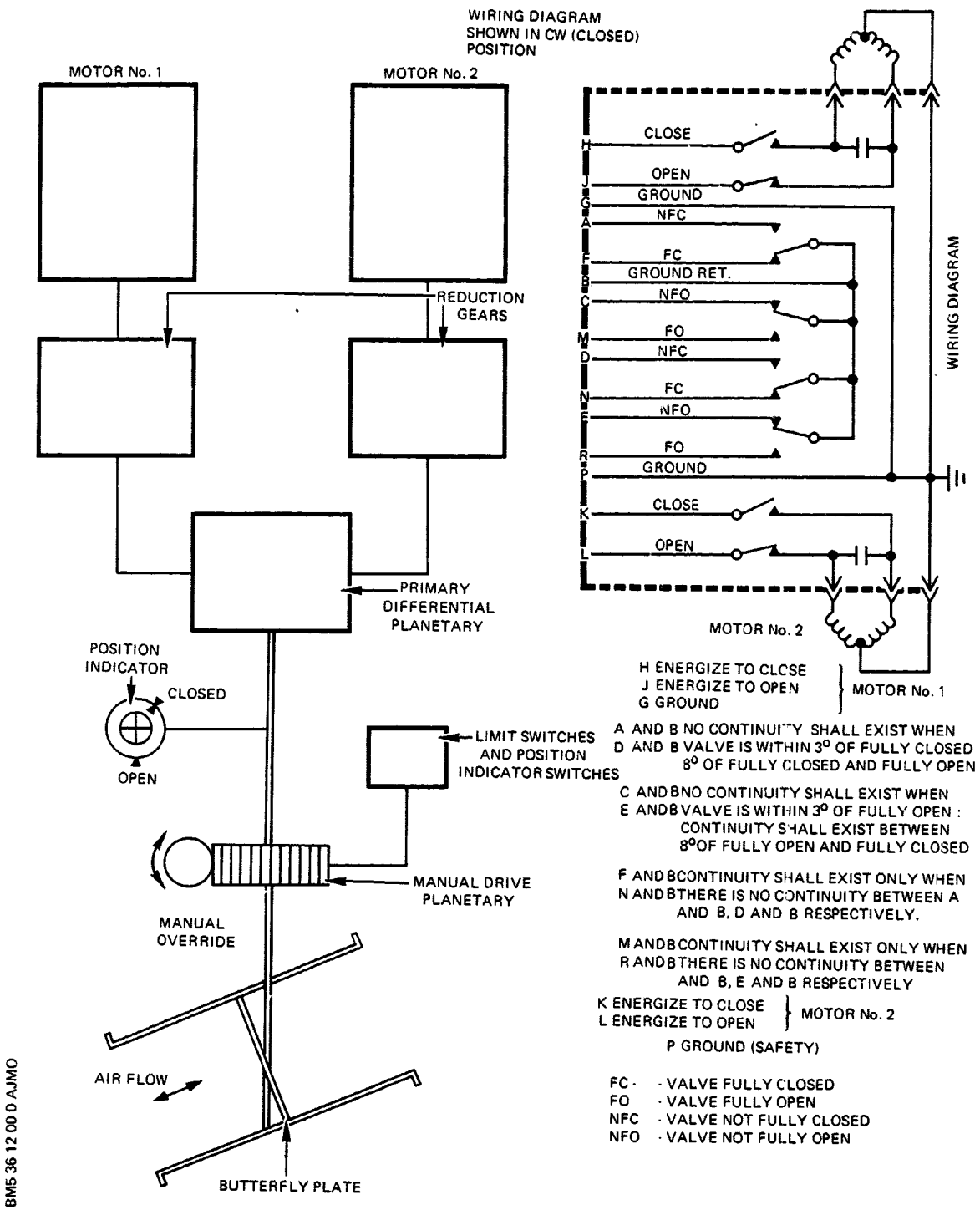
APU Bleed Valve - Electrical Schematic
Figure 006



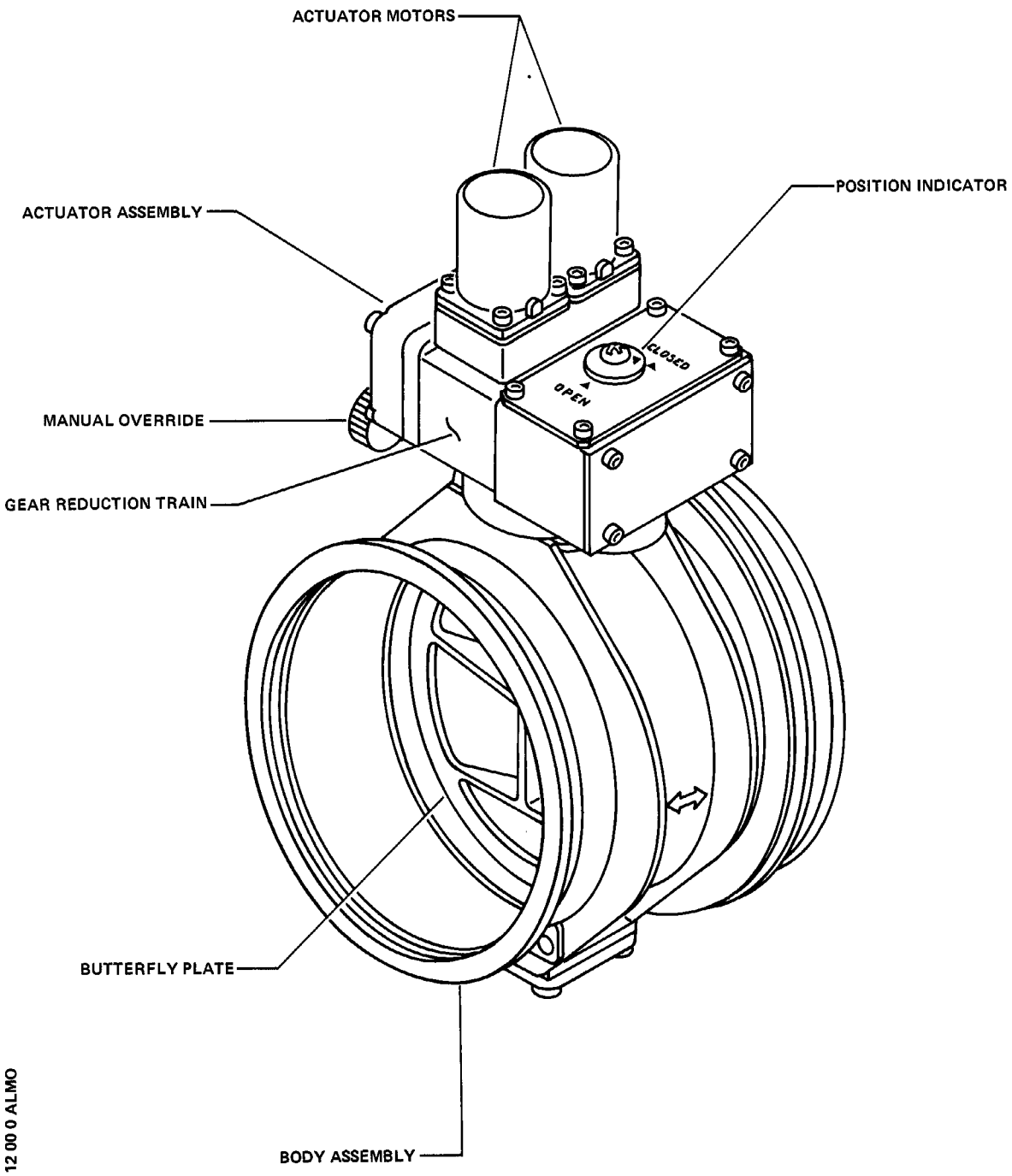
APU Bleed Valve - Electrical Schematic
Figure 007

4. Crossfeed

A. Description
(Ref. Fig. 008)
(Ref. Fig. 009)
The left and right air supply systems are interconnected by a 6 in. dia. duct routed across the fuselage through a non-pressurized cargo compartment, between FR39 and FR40.
The crossfeed valve installed on the crossfeed duct is designed to isolate or interconnect both air bleed systems.
The crossfeed valve is an electrically controlled, 6 in. dia. butterfly shutoff valve.
For safety reasons, the valve is equipped with two electric motors which can both actuate the butterfly in the opening and closing directions : one motor is used in automatic mode, the other in manual mode.
Each motor is supplied with single phase, 115VAC, 400 Hz via two normally closed limit switches ; power supply is cut off when the valve is fully open or fully closed.
Each motor includes a brake system which locks the butterfly in the position attained when power supply is cut off.
The motors drive via reduction gears, a primary differential planetary gear which in turn drives the sun gear of the manual drive planetary gear that can rotate the butterfly plate in either direction.
The valve can be actuated in closing or opening direction by means of a manual override which drives the ring gear of the manual drive planetary gear.



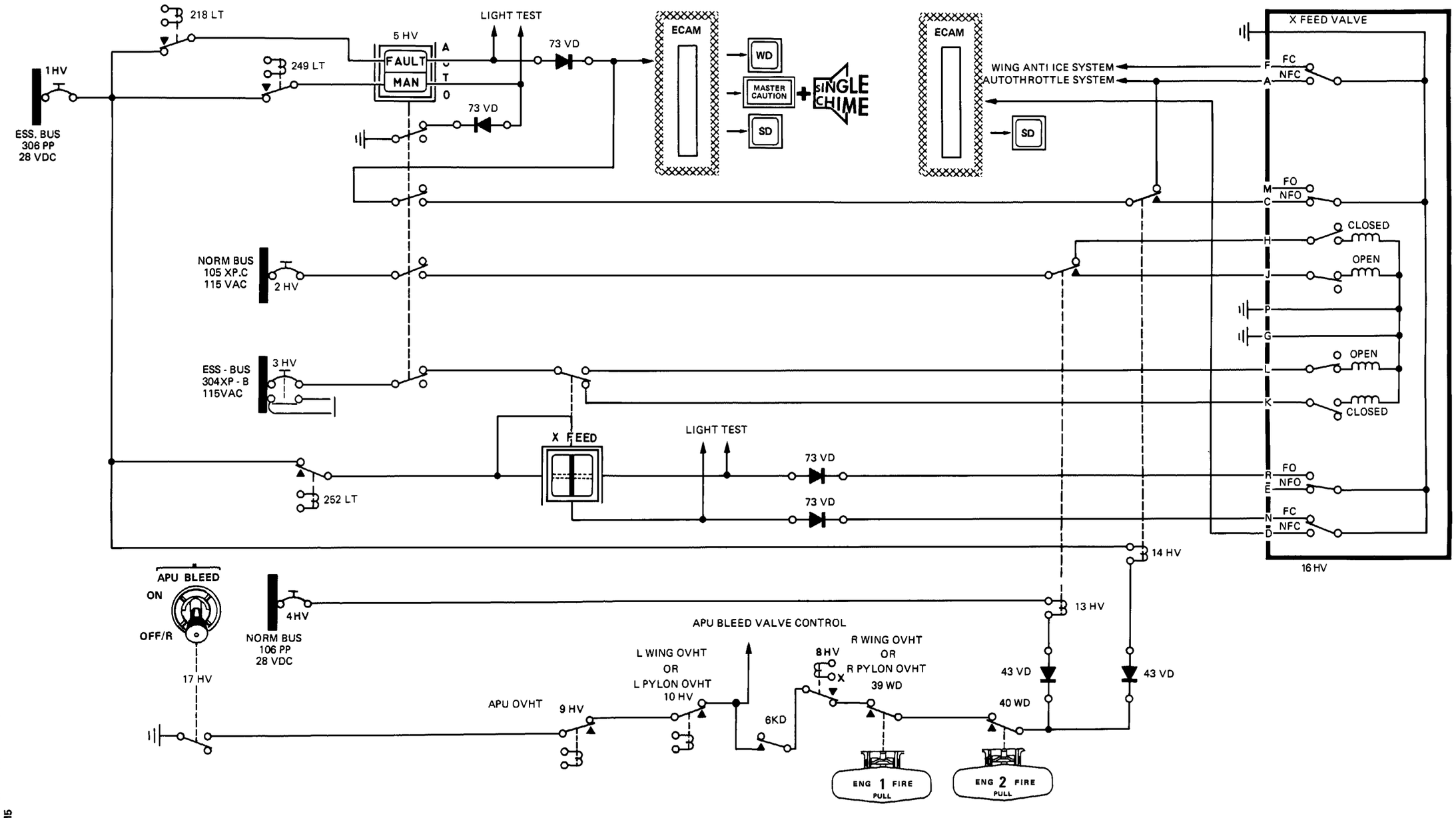
Crossfeed Valve - Schematic
Figure 008



Crossfeed Valve - Perspective View
Figure 009

B. Controls and Indicating
(Ref. Fig. 010)

- X FEED mode pushbutton switch pressed (in) (MAN legend off)
  Configuration corresponding to automatic operation of valve actuated by motor No.1 and controlled in the same position as APU bleed valve, i.e. :
  . Closed : . when air is normally bled from engine (s)
  . when ENG FIRE handle is actuated
  . when ambient overheat is detected (LEAK warning).
  . Open : . when APU air bleed is selected (for air conditioning, wing ice protection or engine starting).
  The X FEED valve position pushbutton switch flowbar is in line if the valve is open and cross line if the valve is closed.
- Warning : FAULT amber warning legend on with ECAM system activated.
  . MASTER CAUTION lights flash on CAPT and F/O main instrument panels 3VU and 5VU.
  . Single chime.
  . On the left ECAM display unit : display of the warning and its associated actions
  . On the right ECAM display unit : display of the AIR BLEED page.
  The only possible action is to use the manual control.
- X FEED mode pushbutton switch released (out) (MAN white legend on)
  Configuration corresponding to manual operation of valve actuated by motor No.2.
  This is an abnormal procedure ; the valve must be manually opened in the following cases only :
  . Cross supply of refrigeration unit packs (right engine to left pack or left engine to right pack).
  . Starting of one engine with air bled from the other (except for certain flight conditions during which starting by self rotation is possible).
  . Engine air bleed failure in icing conditions.
  . Starting of right engine on the ground via ground connectors or APU supply.
  To open the valve, press X FEED valve position pushbutton switch; the flowbar is in line when the valve is fully open.
  To close the valve, release the X FEED valve position pushbutton switch; the flowbar turns cross line when the valve is closed.



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Crossfeed Valve - Electrical Schematic
Figure 010

APU BLEED AIR SUPPLY AND CROSSBLEED SYSTEMS - DUCTING REMOVAL/INSTALLATION

1. General

Fuselage-mounted ducts are interconnected :
- by clamps
- by flexible connectors.

This topic details typical removal/installation procedures of such connection in pneumatic system :

2. Reason for the Job

A. Typical Disassembly/Assembly and Adjustment of Flexible Connector

B. Removal of APU Air Bleed Supply Ducting

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.
BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

CAUTION : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM.
- PLACE A WARNING NOTICE ON THE GROUND CONNECTORS DISPLAY PROHIBITING OPERATION OF THE PNEUMATIC SYSTEM
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THE ENGINES
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED LOAD VALVE CONTROL SWITCH PLACED IN CLOSE RESET POSITION
- BEFORE PROCEEDING WITH ANY REMOVAL OPERATION, MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.
- ON REMOVAL OF A COMPONENT, PLACE BLANKING PLUG/CAPS ON PIPES TO PROTECT SEALING FLANGES AND TO AVOID THE INGRESS OF FOREIGN MATTER.
- DURING TESTS, PERSONNEL MUST KEEP AWAY FROM PNEUMATIC SYSTEM WHEN IT IS PRESSURIZED ABOVE 45 PSI.
- ON FITTING JANITROL CLAMPS, STRICTLY OBSERVE TORQUE VALUE OUTLINED ON EACH CLAMP, IN ORDER TO AVOID DAMAGING COMPONENTS OR PIPES.

3. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Torque Wrench 0 to 1.5 m.daN (0 to 130 lbf.in.)
C. Material No. 04-007	Common Greases (Ref. 20-31-00)
D.	Warning Notices
E.	Blanking Plugs/Caps
Referenced Procedures	
R - 20-26-00, P. Block 301	Installation of Expansion Joints
- 24-41-00, P. Block 301	AC External Power Control

ITEM	DESIGNATION
- 36-12-12, P. Block 401	APU Bleed Check Valve
- 36-22-12, P. Block 401	Overheat Sensing Element
- 36-12-00, P. Block 601	APU Bleed Air System

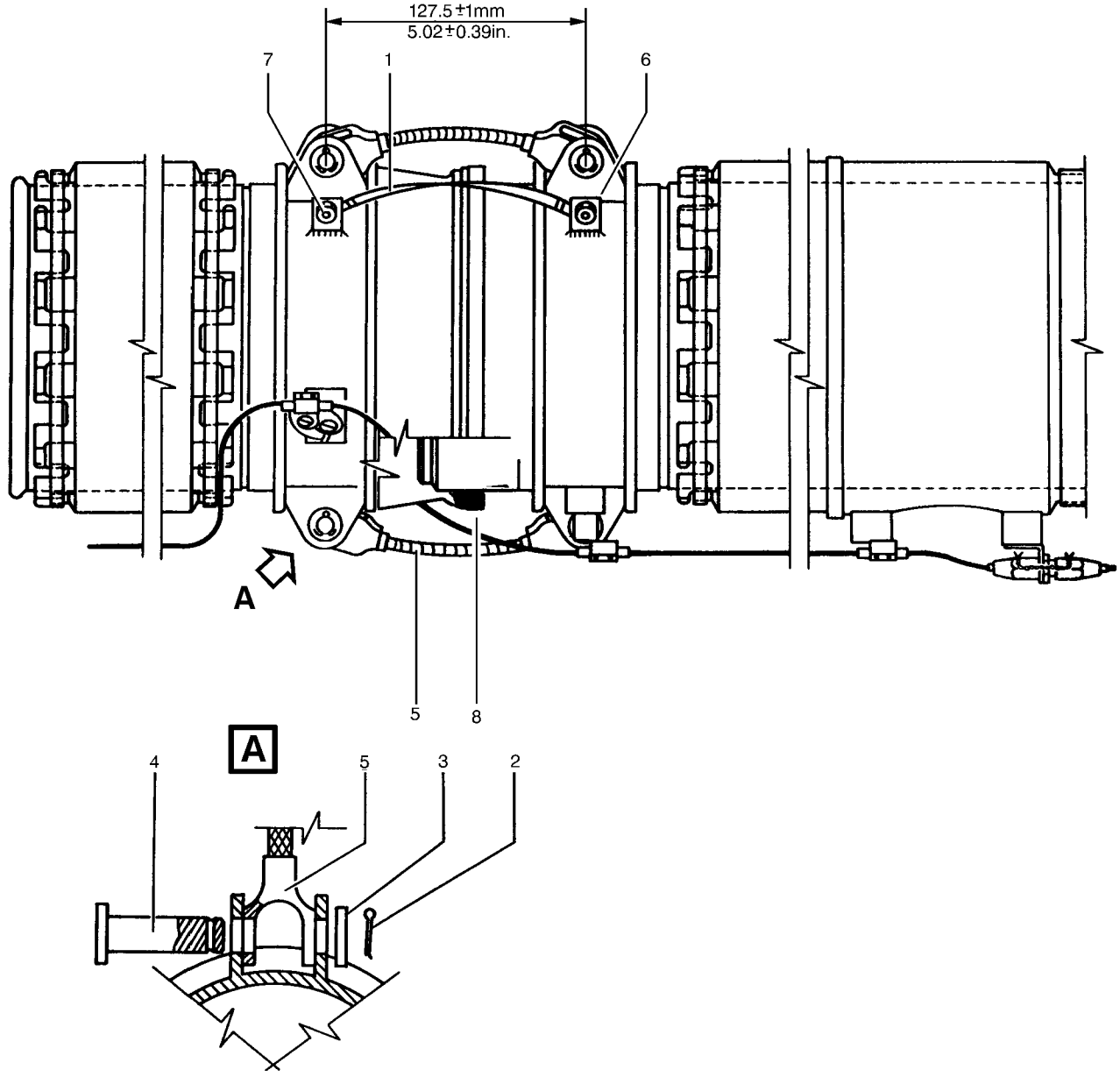
4. Typical Disassembly/Assembly and Adjustment of Flexible Connector

A. Disassembly of Flexible Connector with Cables
(Ref. Fig. 401)
(1)Disconnect bonding strip (1).
(2)Remove cotter pins (2), washers (3) and bolts (4) from one end of cables (5).
(3)Separate male and female halves of flexible connector and seals.
NOTE : Take care not to damage seal retaining grooves.
(4)Clean and inspect both halves of connector and in particular seal bearing surfaces on male half which must be completely smooth. Discard if necessary.
(5)Remove and discard seal(s) (8).
NOTE : Take care not to damage seal retaining grooves.
(6)Install seal(s) (8) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1).

R B. Assembly and Adjustment of Flexible Connector with Cables
(1)Mate male and female halves of connectors using a rotating movement with one half so as to avoid damaging or pinching the O-rings. Align bonding strip (6) terminals.
(2)Connect bonding strip (3) using bolt, washer and nut assembly (7).
(3)Install rigid shackles tools (dimension 127.5 ± 1 mm/5.02 ± 0.39 in.)
NOTE : The final installation of cables is made when installation and adjustment of flexible connector with links is achieved.
(4)Connect cables using bolts (4), washers (3) and cotter pins (2).

R C. Disassembly of Flexible Connector With Links
(Ref. Fig. 402)
(1)If necessary, remove insulation muff (7).
(2)Unlock and loosen locknut (6).
(3)When necessary, disconnect bonding strip (1).
(4)Remove bolt (2), nut (3) and washers (4) assemblies and remove links (5).
(5)Separate male and female halves of connector.
(6)Remove and discard seal(s) (8).
NOTE : Take care not to damage seal retaining grooves.
(7)Clean and inspect both halves of connector ; in particular, seal bearing surfaces on male half which must be completely smooth.
(8)Install seal(s) (8) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1).

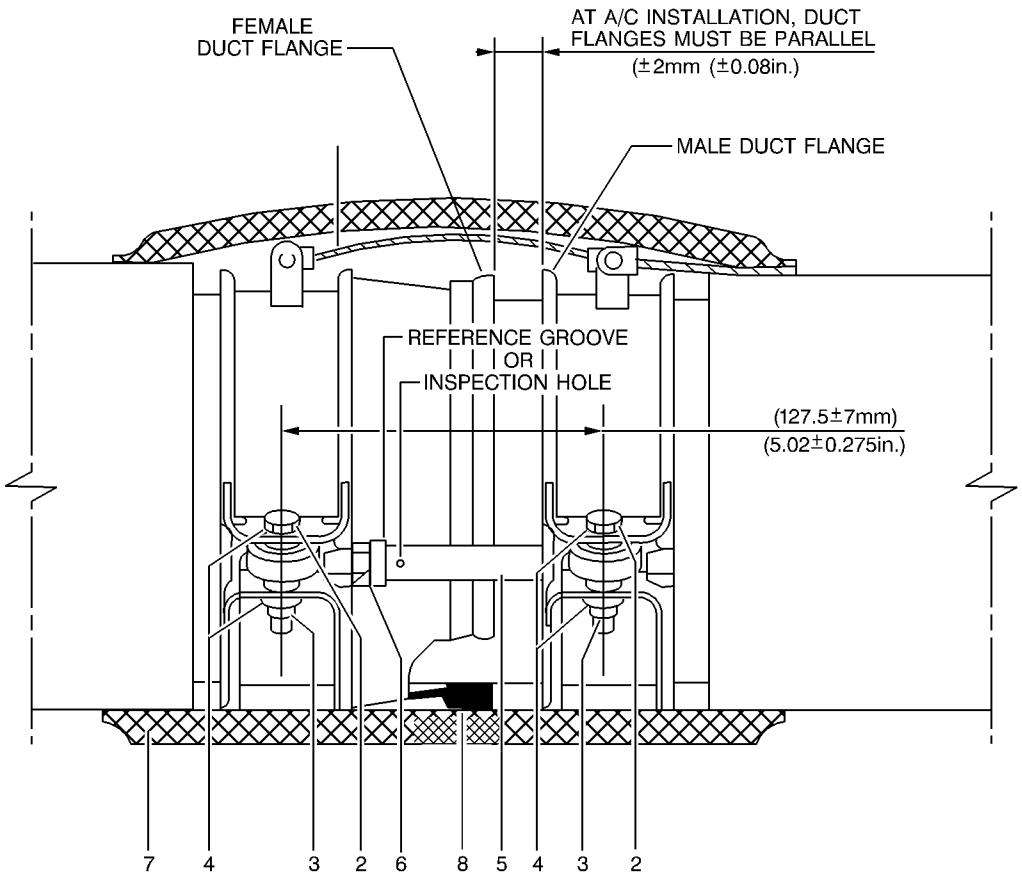
R D. Assembly and Adjustment of Flexible Connector with Links
(1)Mate male and female halves of connectors, using a rotating movement with one half to avoid damaging seal.



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Flexible Connector with Cables
Figure 401

R



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Flexible Connector With Links
Figure 402

R

(2)Align terminals of bonding strip (1).
(3)Install links (5) using bolt (2), nut (3) and washers (4) assemblies ; observe nominal dimension of 127.5 ± 7 mm (5.02 ± 0.275 in.). Tighten and safety locknut (6) on link (5).
NOTE : - Make certain that threaded ends of links are visible through inspection holes or reference grooves are inside link bodies.
- Make certain that duct flanges are parallel so as to ensure no angulation (a tolerance of ± 2 mm (0.08 in.) throughout the whole circumference of the duct is accepted) (Ref. Fig. 402).
(4)Connect bonding strip (1), if necessary.

5. Removal/Installation of APU Air Bleed Supply Ducting

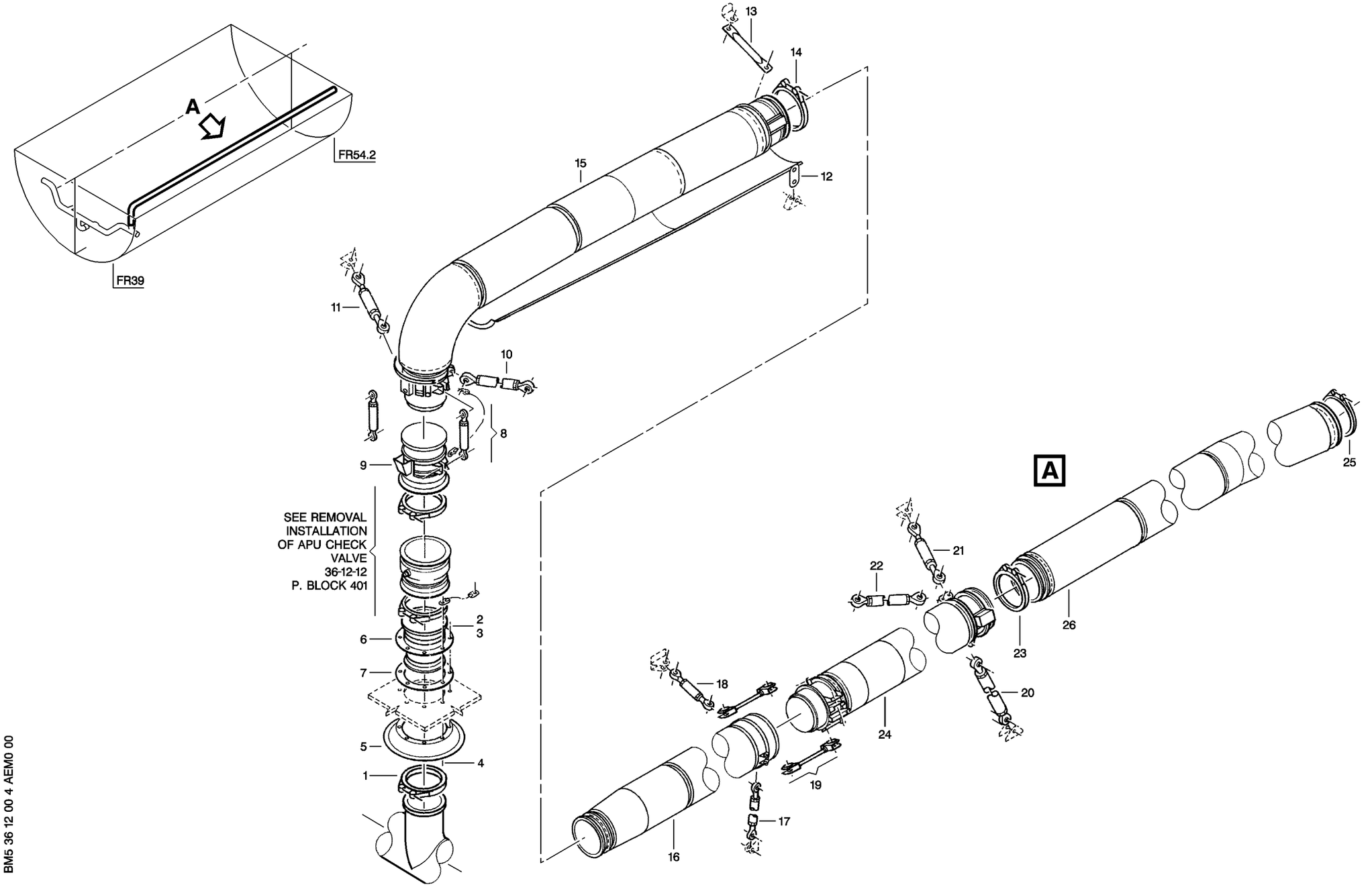
A. Job Set-Up
(1)Position access platforms for access to APU and air conditioning compartment (zones 143 and 315/316).
(2)Open access doors in zones 143, 147, 151, 161, 171, 311, 312, 313, 314, 315 and 316.
(3)Make certain that warning notices are displayed in flight compartment to prohibit the use of the relevant systems.
(4)Open, safety and tag the following circuit breaker :

PANEL	SERVICE	IDENT.	LOCATION
131VU	APU/START	50KA	317/B54
131VU	APU/ECB SUPPLY MAIN	1KD	317/B57
131VU	APU/ECB BACK UP/SUPPLY	58KD	317/B52
133VU	FLT CTL/PITCH UNCOUPLING SOLENOID	1CF	331/V64
133VU	ENGINES/ENG 1 & 2/START CTL & WARN	1KG	335/R68
133VU	ELEC/APU GEN GCU/SUPPLY	6XS	332/U83

B. Removal of APU Air Bleed Supply Ducting FR39 to FR54
(Ref. Fig. 403)
NOTE : Take care not to damage sensing elements.
(1)Remove ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).
(2)Remove APU bleed check valve (Ref. 36-12-12, P. Block 401).
(3)Remove clamp (1).
(4)Remove bolts (2), washers (3) and nuts (4).
(5)Remove housing (5), Floor Feedthrough (6) and shim (7).
R (6)Remove flexible connector with links (8) (Ref. paragraph 4.C.).
(7)Remove duct (9).
(8)Remove links (10), (11) and brackets (12), (13).
(9)Remove clamp (14).
(10)Remove duct (15).
(11)Remove links (17) and (18). Hold duct.
(12)Remove flexible connector with cables (19).
(13)Remove duct (16).
(14)Remove links (20), (21) and (22). Hold duct.
(15)Remove clamp (23).
(16)Remove duct (24).
(17)Remove clamp (25).

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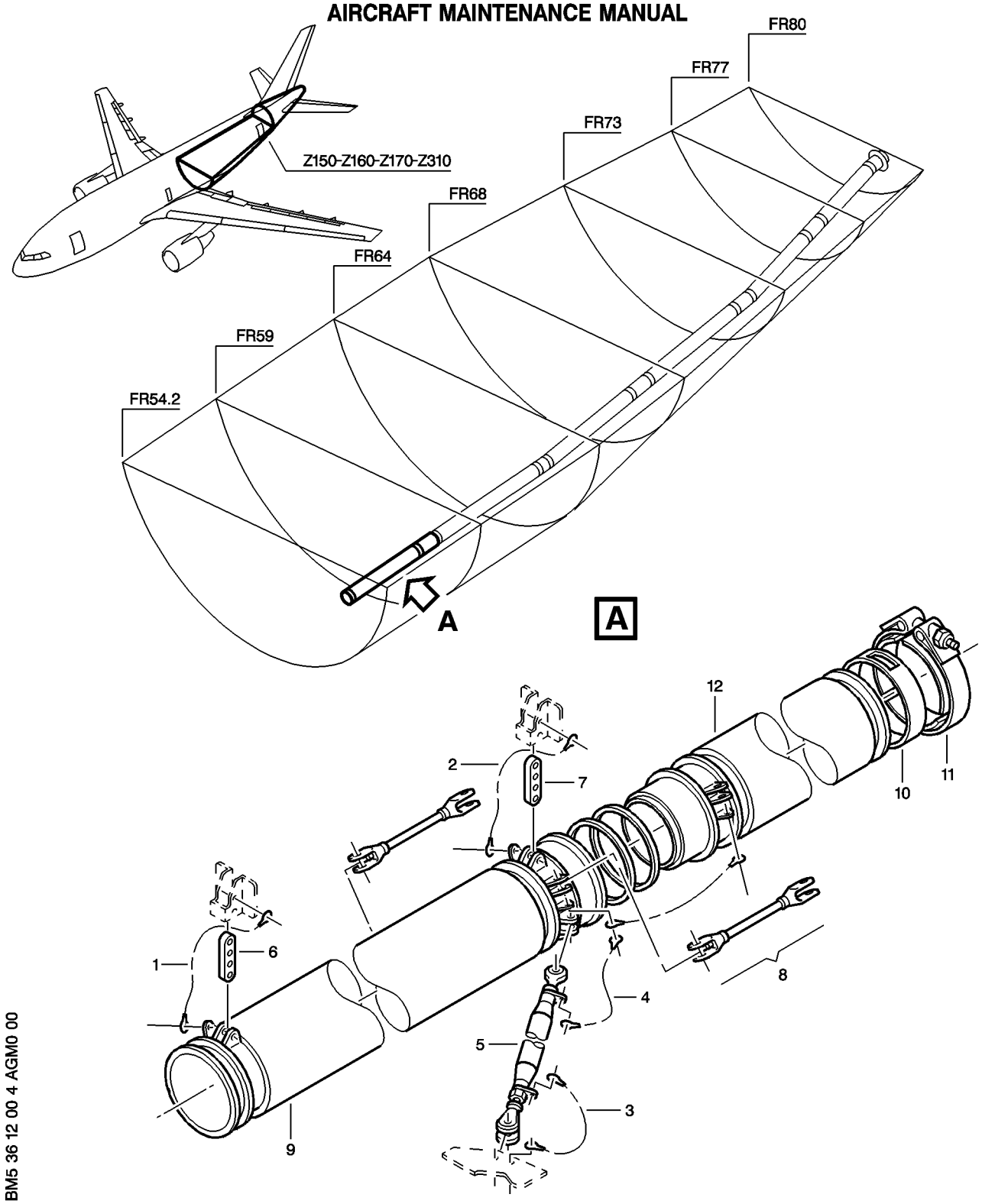
R APU Air Bleed Supply Ducting FR39 to FR54
Figure 403

(18)Remove duct (26).

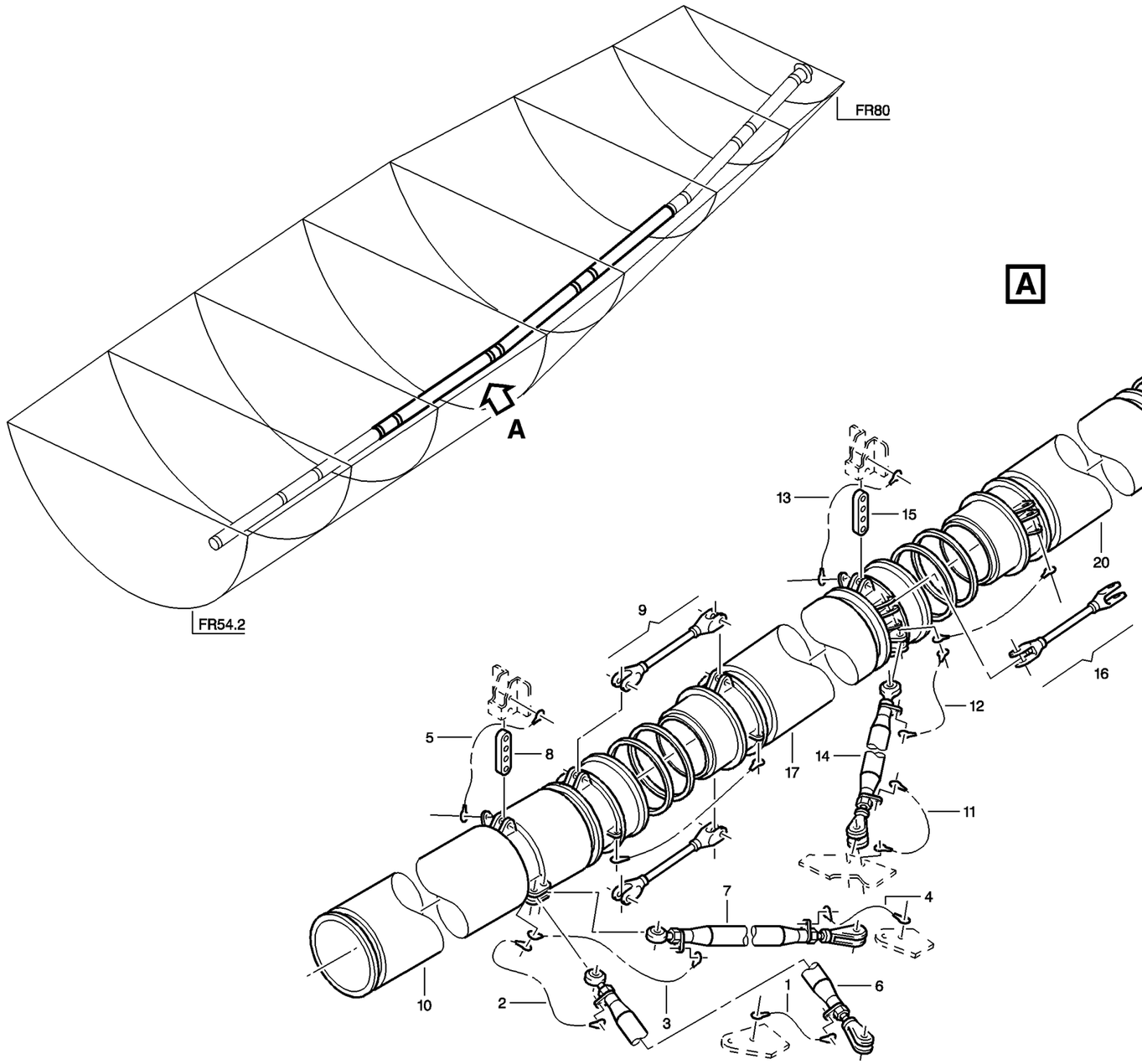
C. Removal of APU Air Bleed Supply Ducting FR54 to FR59
(Ref. Fig. 404)
NOTE : Take care not to damage sensing elements.
(1)Remove ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).
(2)Disconnect bonding strips (1), (2), (3) and (4).
(3)Remove link (5) and brackets (6), (7). Hold duct.
(4)Remove flexible connector with cables (8) (Ref. paragraph 4.A.).
(5)Remove duct (9).
(6)Remove deflector (10) and clamp (11). Hold duct.
(7)Remove duct (12).

D. Removal of APU Air Bleed Supply Ducting FR59 to FR73
(Ref. Fig. 405)
NOTE : Take care not to damage sensing elements.
(1)Remove ambient overheat sensing element (Ref. 36-22-12, P. Block 401).
(2)Disconnect bonding strips (1), (2), (3), (4) and (5).
(3)Remove links (6), (7) and bracket (8). Hold duct.
(4)Remove flexible connector with cables (9) (Ref. paragraph 4.A.).
(5)Remove duct (10).
(6)Disconnect bonding strips (11), (12) and (13).
(7)Remove link (14) and bracket (15). Hold duct.
(8)Remove flexible connector with cables (16) (Ref. paragraph 4.A.).
(9)Remove duct (17).
(10)Remove deflector (18) and clamp (19). Hold duct.
(11)Remove duct (20).
(12)Disconnect bonding strips (21), (22), (23), (24) and (25).
(13)Remove link (26), (27) and bracket (28). Hold duct.
(14)Remove flexible connector with cables (29) (Ref. paragraph 4.A.).
(15)Remove duct (30).

E. Removal of APU Air Bleed Supply Ducting FR73 to FR80
R (Ref. Fig. 406)
R NOTE : Take care not to damage sensing elements.
R (1)Remove ambient overheat sensing element (Ref. 36-22-12, P. Block 401).
R (2)Disconnect bonding strips (1), (2) and (3).
R (3)Remove link (4) and bracket (5). Hold duct.
R (4)Remove flexible connector with cables (6) (Ref. paragraph 4.A.).
R (5)Remove duct (7).
R (6)Remove deflector (8) and clamp (9). Hold duct.
R (7)Remove duct (10).
R (8)Remove clamp (11).
R (9)Remove bolts (12), washers (13), nuts (14) and half sleeves (15) and (16).
R (10)Remove bonding strip (17).
R (11)Remove clamp (18).
R (12)Disconnect bonding strips (19), (20), (21), (22), (23) and (24).
R (13)Remove links (25), (26) and (27). Hold duct.
R (14)Remove duct (28).
R (15)Remove housing connector (29).



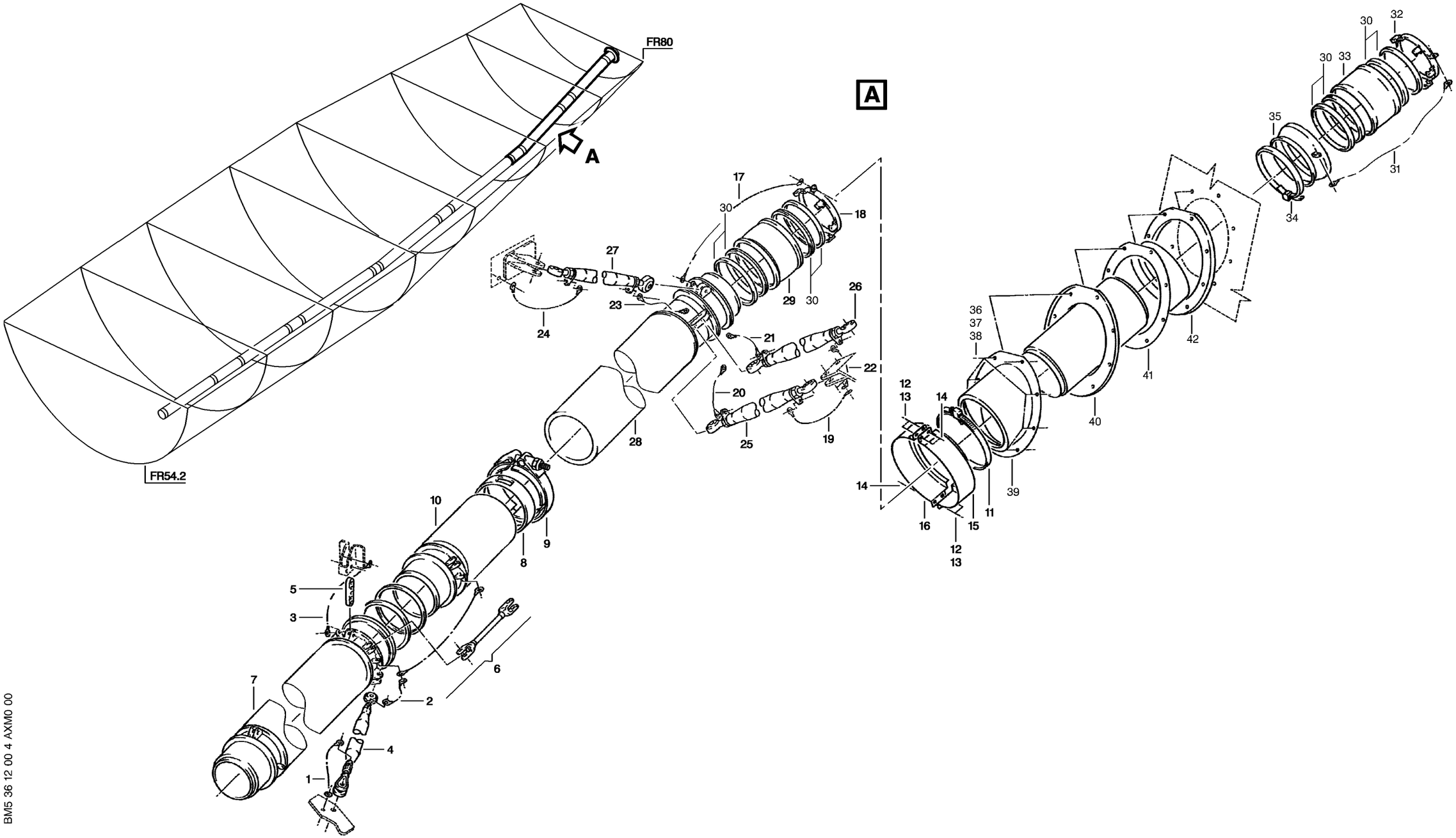
APU Air Bleed Supply Ducting FR54 to FR59
Figure 404



APU Air Bleed Supply Ducting FR59 to FR73
Figure 405

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R



APU Air Bleed Supply Ducting FR73 to FR80
Figure 406

R

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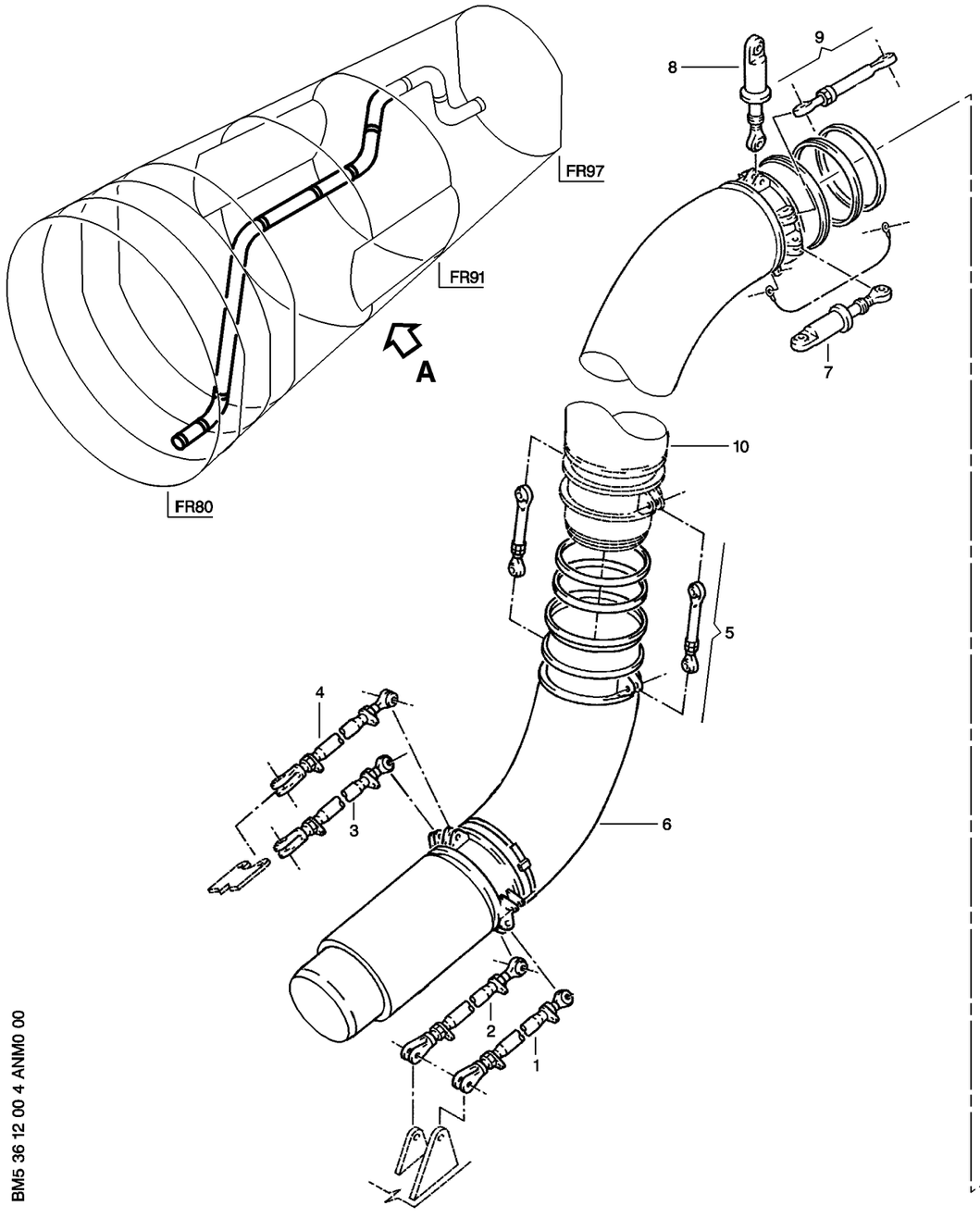
(16)Remove and discard seal(s) (30).
NOTE : Take care not to damage seal retaining grooves.
(17)Disconnect bonding strip (31).
(18)Remove clamp (32).
(19)Remove housing connector (33).
(20)Remove and discard seal(s) (30).
NOTE : Take care not to damage seal retaining grooves.
(21)Remove clamp (34).
(22)Remove deflection-ring (35).
(23)Remove bolts (36), washers (37) and nuts (38).
(24)Remove protective sleeve (39).
(25)Remove feedthrough (40).
(26)Remove protective sleeve (41).
(27)Remove seal (42).

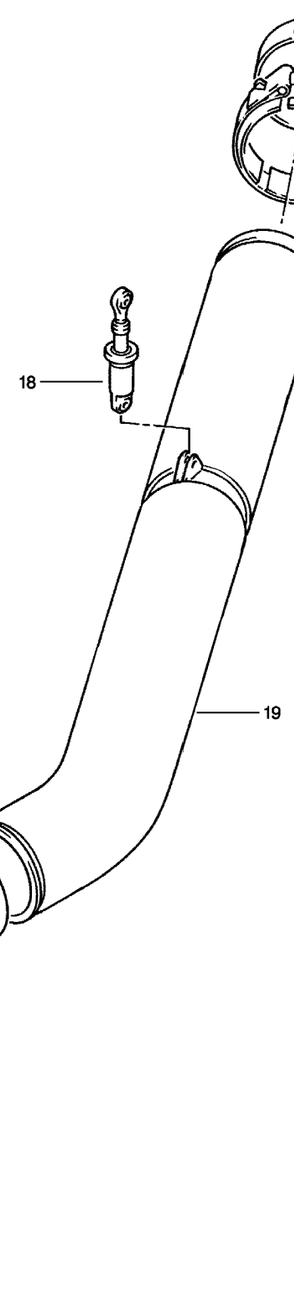
F. Removal of APU Air Bleed Supply Ducting FR80 to FR91
(Ref. Fig. 407)
NOTE : Take care not to damage sensing elements.
(1)Remove ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).
(2)Remove links (1), (2), (3) and (4).
R (3)Remove flexible connector with links (5) (Ref. paragraph 4.C.).
(4)Remove duct (6).
(5)Remove spring-rods (7), (8).
R (6)Remove flexible connector with links (9) (Ref. paragraph 4.C.).
(7)Remove duct (10).
(8)Remove deflector (11) and clamp (12). Hold duct.
(9)Remove spring-rods (13), (14).
(10)Remove duct (15).
(11)Remove deflector (16) and clamp (17).
(12)Remove spring-rod (18).
(13)Remove duct (19).

G. Removal of APU Air Bleed Supply Ducting FR91 to FR96
(Ref. Fig. 408)
NOTE : Take care not to damage sensing elements.
(1)Remove ambient overheat sensing element (Ref. 36-22-12, P. Block 401).
R (2)Remove flexible connector with links (1) (Ref. paragraph 4.C.).
(3)Remove duct (2).
(4)Disconnect bonding strips (3), (4), (5), (6), (7) and (8).
(5)Remove links (9), (10) and (11).
(6)Remove deflector (12) and clamp (13).
(7)Remove duct (14).
(8)Remove spring-rod (15).
R (9)Remove flexible connector with links (16) (Ref. paragraph 4.C.).
(10)Remove duct (17).
(11)Remove gaskets (18) and (19). Check condition.
R (12)Remove flexible connector with links (20) (Ref. paragraph 4.C.).
(13)Remove duct (21).
(14)Remove clamp (22).
(15)Remove duct (23).
(16)Install cap on duct (24).

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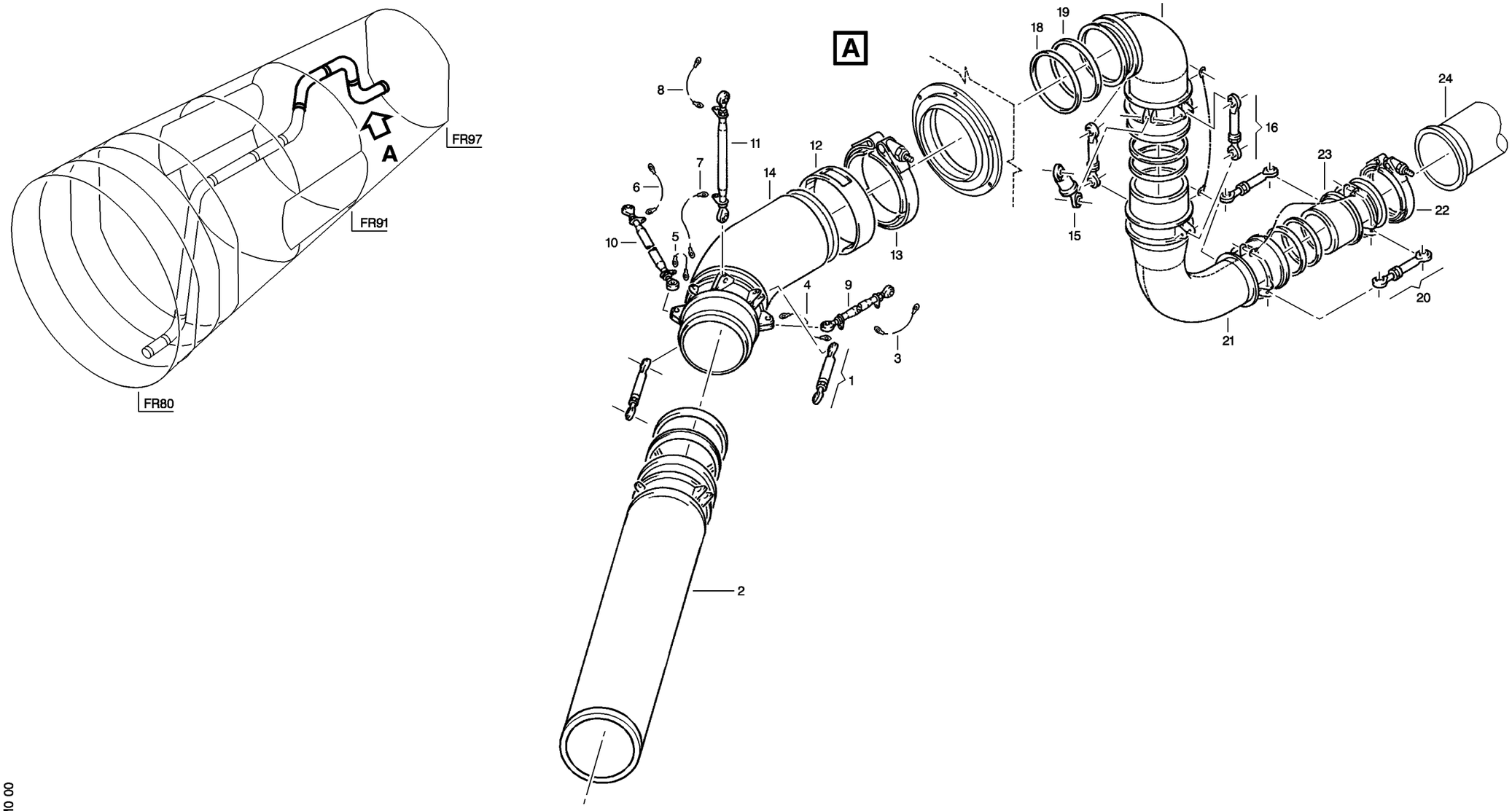
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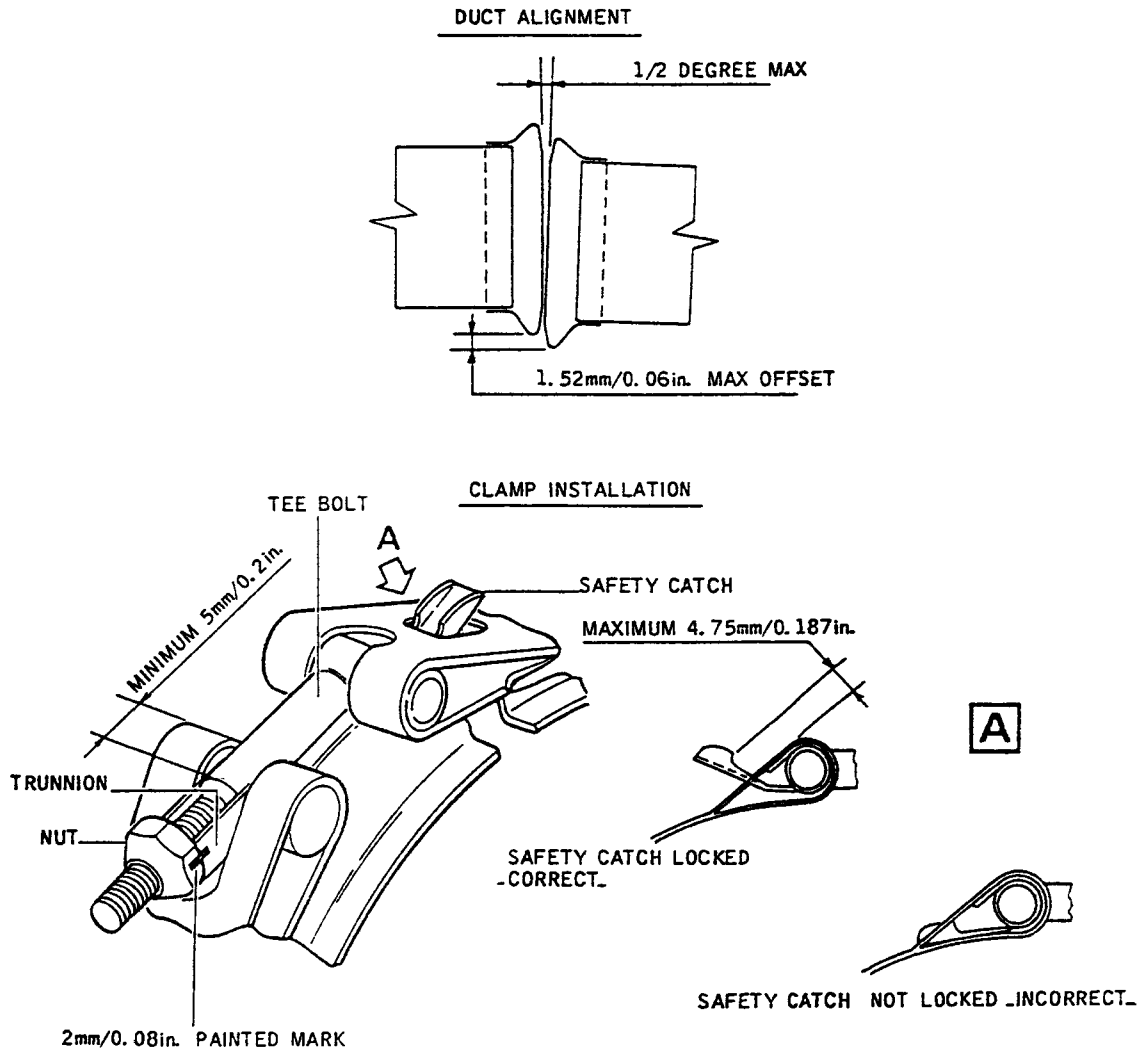
APU Air Bleed Supply Ducting FR80 to FR91
Figure 407



APU Air Bleed Supply Ducting FR91 to FR96
Figure 408

H. Installation of APU Air Bleed Supply Ducting FR91 to FR96
(Ref. Fig. 408)

(1)Remove cap from duct (24).
(2)Check condition of ducts flanges for cleanliness, scoring, crack or deformation.
(Ref. Fig. 409)
(3)Install duct (23).
(4)Check that clamp (22) is clean and in correct condition.
(5)Check that flanges mate with no undue stress, slide open clamp (22) over flanges and install tee bolt in trunnion.
(6)Install duct (21).
R (7)Install flexible connector with links (20) (Ref. paragraph 4.D.).
(8)Install gaskets (18) and (19).
(9)Install duct (17).
R (10)Install flexible connector with links (16) (Ref. paragraph 4.D.).
(11)Install spring-rod (15).
(12)Install duct (14).
(13)Check that clamp (13) is clean and in correct condition.
(14)Check that flanges mate with no undue stress ; slide open clamp (13) over flanges and install tee bolt in trunnion.
(15)Install links (9), (10) and (11).
(16)Connect bonding strips (3), (4), (5), (6), (7) and (8).
(17)Install duct (2).
R (18)Install flexible connector with links (1) (Ref. paragraph 4.D.).
NOTE : Check that attaching parts do not cause misalignment of ducts greater than 0.5 deg. (offset must not exceed 1.52 mm (0.06 in.))
(19)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(20)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.
NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 409).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 409).
If either of these conditions is not met, discard clamp.
NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.
(21)Install deflector (12) on clamp (13). TORQUE to the value given on deflector.
(22)On flexible connectors, check that on-center-distance between link attach fittings is 127.5 ± 7 mm (5.02 ± 0.275 in). (Ref. Fig.) Adjust links (5) if necessary and safety link eyebolt locknut, making certain that eyebolt threads are visible through inspection hole or reference groove is inside link body.
NOTE : The distance between link attach fittings must be the same for both sides.
(23)Install previously removed ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).



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Clamp Installation and Duct Alignment
Figure 409

J. Installation of APU Air Bleed Supply Ducting FR80 to FR91
(Ref. Fig. 407, 409)

(1)Check condition of ducts flanges for cleanliness, scoring, crack or deformation.
(2)Install duct (19).
(3)Check that clamp (17) is clean and in correct condition.
(4)Check that flanges mate with no undue stress, slide open clamp (17) over flanges and install tee bolt in trunnion.
(5)Install spring-rod (18).
(6)Install duct (15).
(7)Check that clamp (12) is clean and in correct condition.
(8)Check that flanges mate with no undue stress ; slide open clamp (12) over flanges and install tee bolt in trunnion.
(9)Install spring-rods (13) and (14).
(10)Install duct (10).
R (11)Install flexible connector with links (9) (Ref. paragraph 4.D.).
(12)Install spring-rods (7) and (8).
(13)Install duct (6).
R (14)Install flexible connector with links (5) (Ref. paragraph 4.D.).
(15)Install links (1), (2), (3) and (4).
NOTE : Check that attaching parts do not cause misalignment of ducts greater than 0.5 deg. (offset must not exceed 1.52 mm (0.06 in.))
(16)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(17)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.
NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 409).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 409).
If either of these conditions is not met, discard clamp.
NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.
(18)Install deflectors (11) and (16) on clamps (12) and (17). TORQUE to the value given on deflectors.
(19)On flexible connectors, check that on-center-distance between link attach fittings is 127.5 ± 7 mm (5.02 ± 0.275 in). (Ref. Fig.) Adjust links (5) if necessary and safety link eyebolt locknut, making certain that eyebolt threads are visible through inspection hole or reference groove is inside link body.
NOTE : The distance between link attach fittings must be the same for both sides.
(20)Install previously removed ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).

K. Installation of APU Air Bleed Supply Ducting FR73 to FR80
(Ref. Fig. 406, 409)

(1)Check condition of ducts flanges for cleanliness, scoring, crack or

deformation.
(2)Check condition of seal (42). Discard if necessary.
(3)Check that seal contact surfaces are smooth and free from scoring.
(4)Install seal (42).
(5)Install protective sleeve (41).
(6)Install feedthrough (40).
(7)Install protective sleeve (39).
(8)Install bolts (36), washers (37) and nuts (38). Tighten.
(9)Install clamp (34) do not tighten at this stage.
(10)Install deflection-ring (35).
(11)Install clamp (32) (on duct side). Do not tighten at this stage.
(12)Install seal(s) (30) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1).
(13)Install housing connector (33) by sliding. Take care not to damage seals.
(14)Correctly position housing connector (33) and tighten clamp (32).
(15)Position deflection-ring (35) and clamp (34). Tighten clamp.
(16)Install bonding-strip (31).
(17)Install duct (28).
(18)Install links (25), (26) and (27).
(19)Connect bonding strips (19), (20), (21), (22), (23) and (24).
(20)Install clamp (18). Do not tighten at this stage.
(21)Install seal(s) (30) in retaining grooves according to seal type (Ref. 20-26-00, P. Block 1).
(22)Install housing connector (29) by sliding. Take care not to damage seals.
(23)Correctly position housing connector (29) and tighten clamp (18).
(24)Install bonding-strip (17).
(25)Install duct (10).
(26)Check that clamp (9) is clean and in correct condition.
(27)Check that flanges mate with no undue stress, slide open clamp (9) over flanges and install tee bolt in trunnion.
(28)Install duct (7).
R (29)Install flexible connector with cables (6) (See paragraph 4.B.).
(30)Install link (4) and bracket (5).
(31)Connect bonding strips (1), (2) and (3).
(32)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(33)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.
NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 409).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 409).
If either of these conditions is not met, discard clamp.
NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.
(34)Install deflector (8) on clamp (9). TORQUE to the value given on

deflector.
(35)Install previously removed ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).

L. Installation of APU Air Bleed Supply Ducting FR59 to FR73
(Ref. Fig. 405, 409)
(1)Check condition of ducts flanges for cleanliness, scoring, crack or deformation.
(2)Install duct (30).
R (3)Install flexible connector with links (29) (Ref. paragraph 4.D.).
(4)Install links (26), (27) and bracket (28).
(5)Connect bonding strips (21), (22), (23), (24) and (25).
(6)Install duct (20).
(7)Check that clamp (19) is clean and in correct condition.
(8)Check that flanges mate with no undue stress, slide open clamp (19) over flanges and install tee bolt in trunnion.
(9)Install duct (17).
R (10)Install flexible connector with cables (16) (Ref. paragraph 4.B.).
(11)Install link (14) and bracket (15).
(12)Connect bonding strips (11), (12) and (13).
(13)Install duct (10).
R (14)Install flexible connector with cables (9) (Ref. paragraph 4.B.).
(15)Install links (6), (7) and bracket (8).
(16)Connect bonding strips (1), (2), (3), (4) and (5).
NOTE : Check that attaching parts do not cause misalignment of ducts greater than 0.5 deg. (offset must not exceed 1.52 mm (0.06 in.))
(17)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(18)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.
NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 409).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 409).
If either of these conditions is not met, discard clamp.
NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.
(19)Install deflector (18) on clamp (19). TORQUE to the value given on deflector.
(20)Install previously removed ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).

M. Installation of APU Air Bleed Supply Ducting FR54 to FR59
(Ref. Fig. 404, 409)
(1)Check condition of ducts flanges for cleanliness, scoring, crack or deformation.
(2)Install duct (12).
(3)Check that clamp (11) is clean and in correct condition.

(4)Check that flanges mate with no undue stress, slide open clamp (11) over flanges and install tee bolt in trunnion.
(5)Install duct (9).
R (6)Install flexible connector with cables (8) (Ref. paragraph 4.B.).
(7)Install link (5) and brackets (6) and (7).
(8)Connect bonding strips (1), (2), (3) and (4).
NOTE : Check that attaching parts do not cause misalignment of ducts greater than 0.5 deg. (offset must not exceed 1.52 mm (0.06 in.)).
(9)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(10)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.
NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 409).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 409).
If either of these conditions is not met, discard clamp.
NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.
(11)Install deflector (10) on clamp (11). TORQUE to the value given on deflectors.
(12)Install previously removed ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).

N. Installation of APU Air Bleed Supply Ducting FR39 to FR54 (Ref. Fig. 403, 409)
(1)Check condition of ducts flanges for cleanliness, scoring, crack or deformation.
(2)Install duct (26).
(3)Check that clamp (25) is clean and in correct condition.
(4)Check that flanges mate with no undue stress, slide open clamp (25) over flanges and install tee bolt in trunnion.
(5)Install duct (24).
(6)Check that clamp (23) is clean and in correct condition.
(7)Check that flanges mate with no undue stress, slide open clamp (23) over flanges and install tee bolt in trunnion.
(8)Install links (20), (21) and (22).
(9)Install duct (16).
R (10)Install flexible connector with cables (19) (Ref. paragraph 4.B.).
(11)Install links (17) and (18).
(12)Install duct (15).
(13)Check that clamp (14) is clean and in correct condition.
(14)Check that flanges mate with no undue stress, slide open clamp (14) over flanges and install tee bolt in trunnion.
(15)Install links (10), (11) and brackets (12), (13).
(16)Install duct (9).
R (17)Install flexible connectors with links (8) (Ref. paragraph 4.D.).
(18)Install feedthrough (6) with shim (7).

(19)Install housing (5) and attach with bolts (2), washers (3) and nuts (4). Tighten.
(20)Install APU Bleed check valve (Ref. 36-12-12, P. Block 401).
(21)Check that clamp (1) is clean and in correct condition.
(22)Check that flanges mate with no undue stress, slide open clamp (1) over flanges and install tee bolt in trunnion.
NOTE : Check that attaching parts do not cause misalignment of ducts greater than 0.5 deg. (offset must not exceed 1.52 mm (0.06 in.)).
(23)TORQUE clamp nuts to 50 % of final torque value and check that tee bolt and safety catch are correctly installed.
(24)Using a mallet, lightly tap on and around top surface of clamp and at the same time, TORQUE to the value given on clamp.
NOTE : For clamps comprising a safety catch, check that when locked, the gap between catch and top surface of clamp does not exceed 4.75 mm (0.187 in.) (Ref. Fig. 409).
Check that non-threaded part of tee bolt engages in trunnion by more than 5 mm (0.2 in.) (Ref. Fig. 409).
If either of these conditions is not met, discard clamp.
NOTE : To indicate that the clamps or couplings have been correctly torqued, a red paint mark of 0.08 x 0.3 in. (2 x 8 mm) approx. can be applied to the nut and trunnion or bolt ; if necessary, remove the existing mark.
(25)On flexible connectors, check that on-center-distance between link attach fittings is 127.5 ± 7 mm (5.02 ± 0.275 in.). (Ref. Fig.) Adjust links (5) if necessary and safety link eyebolt locknut, making certain that eyebolt threads are visible through inspection hole or reference groove is inside link body.
NOTE : The distance between link attach fittings must be the same for both sides.
(26)Install previously removed ambient overheat sensing elements (Ref. 36-22-12, P. Block 401).

P. Test
(1)Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Perform leakage test (Ref. 36-12-00, P. Block 601).

Q. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors in zones 143, 147, 151, 161, 171, 311, 312, 313, 314, 315 and 316.
(3)Remove access platforms.
(4)Remove warning notices in flight compartment.

1. Operational Test

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

A. Reason for the Job

To check for correct operation of crossfeed valve

R

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Warning Notices
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 49-00-00, P. Block 501	Airborne Auxiliary Power

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Make certain that circuit breakers are closed, particularly those associated with AIR BLEED and AIR BLEED & COMPT TEMP panels 22VU and 131VU.

(d)Pressurize pneumatic system using APU
- start-up APU (Ref. 49-00-00, P. Block 501).

(e)On AIR BLEED section of panel 436VU
- press X FEED mode pushbutton switch (AUTO).

(f)On ECAM control panel
- press CLEAR pushbutton switch until MASTER WARN and MASTER CAUTION lights go off and MEMO page is displayed on L ECAM display unit.

R (2)Test of crossfeed valve.

ACTION	RESULT
R On AIR BLEED section of panel 436VU	On AIR BLEED section of panel 436VU
R 1. Make certain that X FEED mode pushbutton switch is selected AUTO.	- MAN legend on X FEED pushbutton switch is off.
R 2. On AIR BLEED section of panel 436VU - place APU BLEED switch in ON position.	On AIR BLEED section of panel 436VU - flowbar on APU BLEED annunciator comes on. - flowbar on X FEED valve position pushbutton switch is in line.
R 3. On AIR BLEED & COMPT TEMP circuit breaker panel 131VU - open VALVES/APU BLEED/CTL & WARN	On AIR BLEED section of panel 436VU

ACTION	RESULT
circuit breaker 4HV (line 312/ G55).	- flowbar on X FEED valve position pushbutton switch is cross line. - FAULT legend on X FEED mode pushbutton switch comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit, the following message is displayed - AIR AIR X FEED FAULT ..... MAN Aural warning : single chime.
- close circuit breaker 4HV	On AIR BLEED section of panel 436VU - flowbar on X FEED valve position pushbutton switch is in line. - FAULT legend on X FEED mode pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit - MEMO page is displayed again.
R 4. On overhead circuit breaker panel 22VU - open AIR BLEED/X FEED VALVE/ WARN circuit breaker 1HV (line 203/G17).	On AIR BLEED section of panel 436VU - flowbar on X FEED valve position pushbutton switch is in line. - FAULT legend on X FEED mode pushbutton switch comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit, the following message is displayed - AIR AIR X FEED FAULT ..... MAN Aural warning : single chime.
- close circuit breaker 1HV	On AIR BLEED section of panel 436VU - flowbar on X FEED valve position pushbutton switch is in line. - FAULT legend on X FEED mode push-button switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU

ACTION	RESULT
	- MASTER CAUTION lights go off. On L ECAM display unit - MEMO page is displayed again.
5. On AIR BLEED section of panel 436VU - place APU BLEED switch in OFF position	On AIR BLEED section of panel 436VU - flowbar on APU BLEED annunciator goes off. - flowbar on X FEED valve position pushbutton switch is cross line.
6. Depressurize pneumatic system - shut down APU (Ref. 49-00-00, P. Block 501)	- No change
7. On AIR BLEED section of panel 436VU - release X FEED valve position pushbutton switch.	- No change
8. On AIR BLEED section of panel 436VU - Make certain that X FEED mode pushbutton switch is selected AUTO.	On AIR BLEED section of panel 436VU - flowbar on X FEED valve position pushbutton switch is cross line.
9. Release X FEED mode pushbutton switch (MAN).	- MAN legend on X FEED pushbutton switch comes on. - flowbar on X FEED valve position pushbutton switch is cross line.
10. Press X FEED valve position pushbutton switch.	- flowbar on X FEED valve position pushbutton switch is in line.
11. Release X FEED valve position push-button switch	- flowbar on X FEED valve position pushbutton switch is cross line.
12. Press X FEED mode pushbutton switch (AUTO).	- MAN legend on X FEED mode push-button switch goes off. - flowbar on X FEED valve position pushbutton switch remains cross line.

(3)Close-up
(a)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Restore system and aircraft to normal operating condition.

WARNING : BEFORE POWER IS SUPPLIED TO THE AIRCRAFT, MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.
WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED
- DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM
- DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP
- DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.

1. Reasons for the Job

A. Leakage checks of APU Bleed Air Supply system by pressurization using an external air supply or APU.
Visual inspection of ducts and couplings.
Visual inspection of electrical cables.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platforms
B.	Warning Notices
C. 97A21102500000	Pressurization Equipment-APU Bleed Air System
D.	
E. 97A21102505000	Blanking Tool Equipped with Pressure Gage APU Bleed Air System Air Source, 3.5 bars (51 psi), with pressure gauge and safety device triggered at 4 bars (58 psi)
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 36-12-12, P. Block 401	APU Bleed Check Valve - Removal/Installation
- 36-22-00, P. Block 601	Manifold Air Leak Detection
- 49-00-00, P. Block 501	Airborne Auxiliary Power - Adjustment/Test
- 49-10-00, P. Block 401	Power Plant - Removal/Installation
- 49-51-11, P. Block 401	APU Bleed Load Valve - Removal/Installation

3. Procedure

A. Job Set-Up
(1)Position access platforms for access to APU and air conditioning compartment (zones 143 and 315/316).
(2)Open access doors in zones 143, 147, 151, 161, 171, 311, 312, 313, 314, 315 and 316.

(3)Make certain that warning notices are displayed in flight compartment to prohibit the use of the relevant systems.

(4)If leakage check is performed by pressurization using an external air supply, carry out the following job set-up steps.
(a)At STA4937, FR96, zone 316, remove sleeve upstream of APU bleed load valve (11OHB), then install pressurization equipment 97A21102500000.
(b)In air conditioning compartment, between STA2082/FR38 and STA2241/FR39, remove APU check valve (Ref. 36-12-12, P. Block 401) and duct upstream of check valve.
(c)Install blanking tool equipped with pressure gage 97A21102505000 in place of check valve and duct.
(d)Blank off supply system of APU fuel system double-wall ventilation jet pumps.

(5)If leakage check is performed by pressurization using APU, carry out the following job set-up steps.
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that circuit breakers are closed, particularly those associated with AIR BLEED and AIR BLEED & COMPT TEMP panels 22VU and 131VU.
(d)On COMPT TEMP panel 437VU, make certain that :
- PACK VALVE 1 and 2 pushbutton switches are released (out) (valves closed) and FAULT legends are off.

(e)On AIR BLEED section of panel 436VU
- Make certain that ENG 1 and ENG 2 BLEED VALVE pushbutton switches are released (out) (OFF/R)
  . OFF/R legends on ENG 1 and ENG 2 BLEED VALVE pushbutton switches come on.
  . Flowbar on BLEED VALVE annunciator goes off.
- Make certain that ENG 1 and ENG 2 HP VALVE pushbutton switches are released (out) (OFF)
  . OFF legends on ENG 1 and ENG 2 HP VALVE pushbutton switches come on.
- Release X FEED mode pushbutton switch (MAN)
  . MAN legend on X FEED mode pushbutton switch comes on.
- PRESS X FEED valve position pushbutton switch
  . Flowbar on X FEED valve position pushbutton switch is in line.
- Make certain that APU BLEED switch is in OFF/R position
  . Flowbar on APU BLEED annunciator is off.

(f)On ANTI ICE section of panel 426VU, make certain that :
- WING/SUPPLY pushbutton switch is released (out).

(g)Install warning notices prohibiting operation of air bleed system.
(h)On engines :
- Make certain that engine 1 and engine 2 bleed valves are not manually locked in closed position (i.e. visual position indicators in CLOSE position).

B. Leakage Checks (pressurization using external air supply)

(1)Apply a stabilized 3.5 bars (51 psi) pressure, then cut off air supply.
(2)After 8 minutes, check that pressure has not decreased below 3 bars (43.5 psi).
(3)While pressure is applied check all joints by feeling and listening. Diffused leakage is allowed at any joint ; however, jet blasts are not permissible.
(4)Completely depressurize and disconnect air source.
(5)Remove pressurization equipment and install flexible connector male half (Ref. 49-10-00, P. Block 401).
(6)Remove blanking equipment and install duct and check valve (Ref. 36-12-12, P. Block 401).
(7)Remove blanking cap ; connect supply system of APU fuel system double-wall ventilation jet pumps.

C. Leakage Checks (pressurization using APU)
(1)Start APU (Ref. 49-00-00, P. Block 501).
(2)On AIR BLEED section of panel 436VU :
- place APU BLEED switch in ON position
- flowbar on APU BLEED annunciator is ON
- check that PRESS indicator reads between 20 and 30 psi approx.
(3)Check all ducts, especially at couplings, for evidence of leakage (Ref. 36-22-00, P. Block 601).
(4)Shutdown pressurization.
(5)On AIR BLEED section of panel 436VU :
- place APU BLEED switch in OFF/R position.
- flowbar on APU BLEED annunciator goes off.
(6)Shutdown APU (Ref. 49-00-00, P. Block 501).

D. Visual Inspections
(1)On the APU bleed air supply ducting from LP bleed check valve in zone 143 to APU bleed load valve in zone 315/316, visually check :
(a)That evidence of cracks, distorsion and leakage does not exist in ducts, connectors and couplings (clamps, flexible connectors).
(b)For good condition and security of ducting insulation material attachment.
(c)That evidence of obvious leakage does not exist (shown by discoloration of adjacent structure, components or electrical wiring).
(d)That duct attachments are correctly installed, clamps correctly tightened (alignment of marks on nuts and trunnions or bolts if marks are available), crack evidence on supports, rods and attachment lugs does not exist and that bonding leads are correctly attached and in good condition.
NOTE : In the absence of marks on the clamps, check torquing of the clamp(s) with a wrench only if doubt subsists or if traces of leakage are evidenced.
(2)Check electrical wiring for dirt, signs of ageing, alteration, overheating, scaling of deformation which might adversely affect their performance.

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Install all access doors in zones previously mentioned.
(3)Remove access platforms.
(4)Remove warning notices prohibiting the use of the various systems involved.
(5)Remove all ground handling and maintenance equipment, all access equipment and miscellaneous items.

CROSSFEED VALVE 16HV - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- **MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED**
- **DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Torque Wrench 0 to 0.80 m. da N (0 to 70 lbf. in.)
C.	Blanking Plugs/Caps
D.	Circuit Breaker Safety Clips
E.	Warning Notices
Referenced Procedures	
- 32-12-11, P. Block 301	Main Gear Main Door - (Ground Door(s) Opening)
- 36-12-00, P. Block 501	APU Bleed Air Supply and Cross Bleed Systems

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/X FEED VALVE/MAN CTL	3HV	203/G18
22VU	AIR BLEED/X FEED VALVE/WARN	1HV	203/G17
131VU	AIR BLEED & COMPT TEMP/X FEED AUTO CTL	2HV	315/D52
131VU	AIR BLEED & COMPT TEMP/VALVES/APU BLEED CTL & WARN	4HV	312/G55

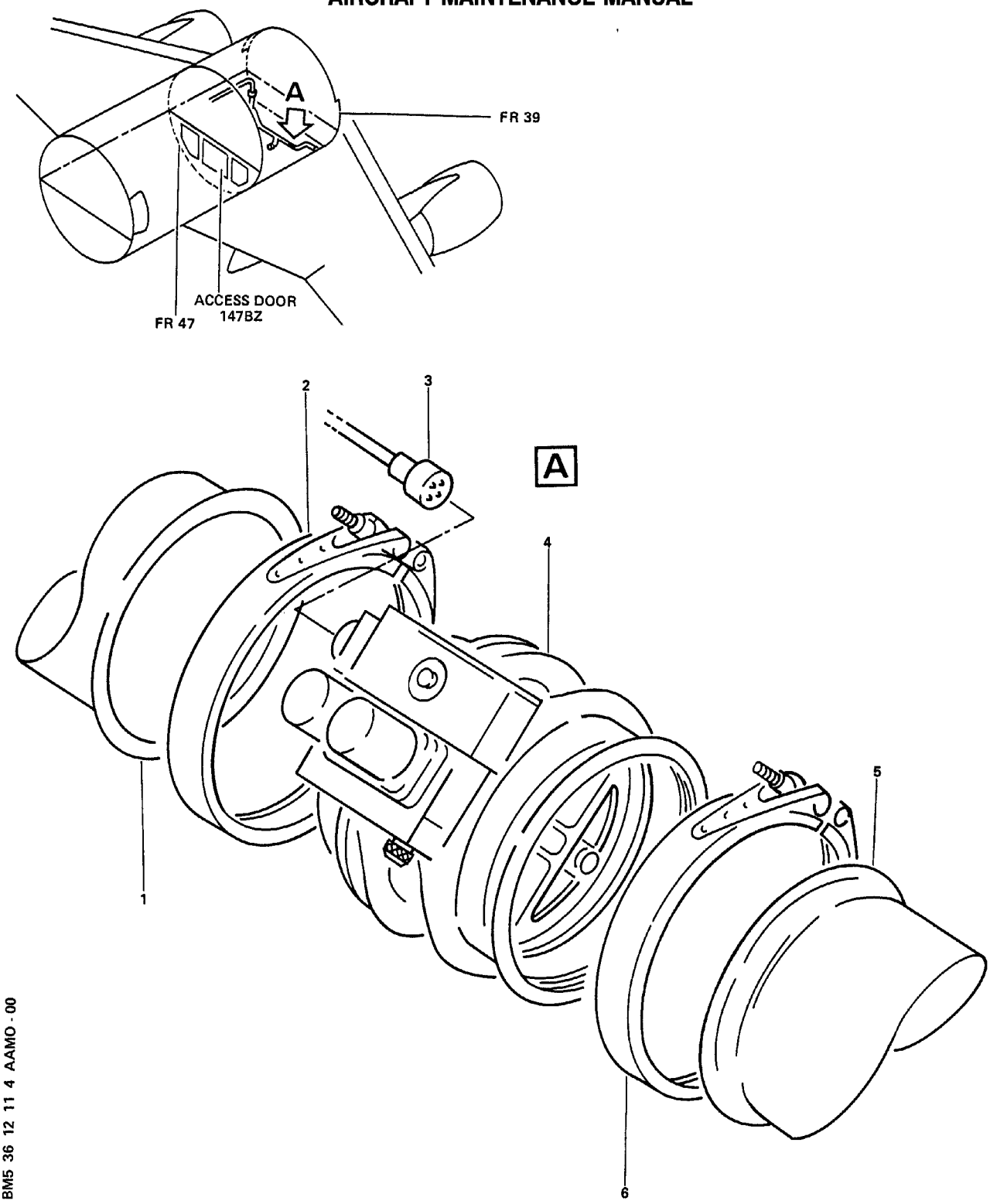
(2)Open main gear door (Ref. 32-12-11, P. Block 301).
(3)Position access platform at main gear door.
(4)Open access door 147BZ.

B. Removal

(Ref. Fig. 401)

NOTE : The valve must be replaced without interfering with the rods, supports and flexible connectors.

(1)Disconnect electrical connector (3).
(2)Remove clamp (2).
(3)Hold valve (4) and remove clamp (6).
(4)Remove valve (4).
(5)Cap open ends of ducts (1) and (5) and electrical connector (3).



Crossfeed Valve
Figure 401

C. Installation
(1)Remove blanking plugs/caps from ducts (1) and (5) and electrical connector (3).
(2)Check for correct condition of duct flanges.
(3)Install valve between ducts (1) and (5) with butterfly shaft positioned horizontally and actuator oriented rearwards.
(4)Install clamp (6) ; do not tighten at this stage.
(5)Install clamp (2) ; do not tighten at this stage.
(6)Tighten clamps (2) and (6). TORQUE to the value given on clamps.
(7)Connect electrical connector (3) to valve (4).
(8)Remove safety clips and tags and close circuit breakers 1HV, 3HV, 2HV and 4HV.

D. Test
Perform test of crossfeed valve manual control (Ref. 36-12-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
R (2)Close access door.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS
R DOORS/PANELS AT FR47.
R (a)Close access door 147BZ.
(3)Remove access platform.
(4)Close main gear door (Ref. 32-12-11, P. Block 301).
(5)Remove warning notices.

CROSSFEED VALVE 16HV - DEACTIVATION/REACTIVATION PROCEDURES

Ref. : MEL Sect. 1-36, Item 13.
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM, MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.

1. Deactivation

A. Reason for the Job
To permit dispatch of the aircraft with crossfeed valve automatic control inoperative.

B. Equipment and Materials

ITEM	DESIGNATION
(1)	Electrical Ground Power Unit - 3-Phase, 115/200 V, 400 Hz, 90 KVA
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Initial conditions
- correct electrical power supply
- forward services ventilation system in operation
- panel circuit breakers closed, particularly those associated with **AIR BLEED** and **AIR BLEED & COMPT TEMP.**

(b)On **AIR BLEED** section of panel **436VU**
- press **X FEED** mode pushbutton switch **(AUTO).**

(2)Deactivation

ACTION	RESULT
On **AIR BLEED** section of panel **436VU**	On **AIR BLEED** section of panel **436VU**
1. Release **X FEED** mode pushbutton switch **(MAN)**	- **MAN** legend on **X FEED** mode pushbutton switch comes on.
2. Press **X FEED** valve position pushbutton switch	- Flowbar on **X FEED** valve position pushbutton switch is in line.
3. Release **X FEED** valve position pushbutton switch	- flowbar on **X FEED** valve position pushbutton switch is cross line.

R

(3)Close-up
(a)De-energize the aircraft electrical network and disconnect

electrical ground power unit.

2. Reactivation
   - troubleshoot crossfeed valve automatic control system (Ref. TSM 36-12-00).

APU BLEED CHECK VALVE - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- **MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED**
- **DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP.**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Torque Wrench 0 to 0.8 m.daN (0 to 70 lbf.in.)
C.	Blanking Plugs/Caps
D.	Warning Notices

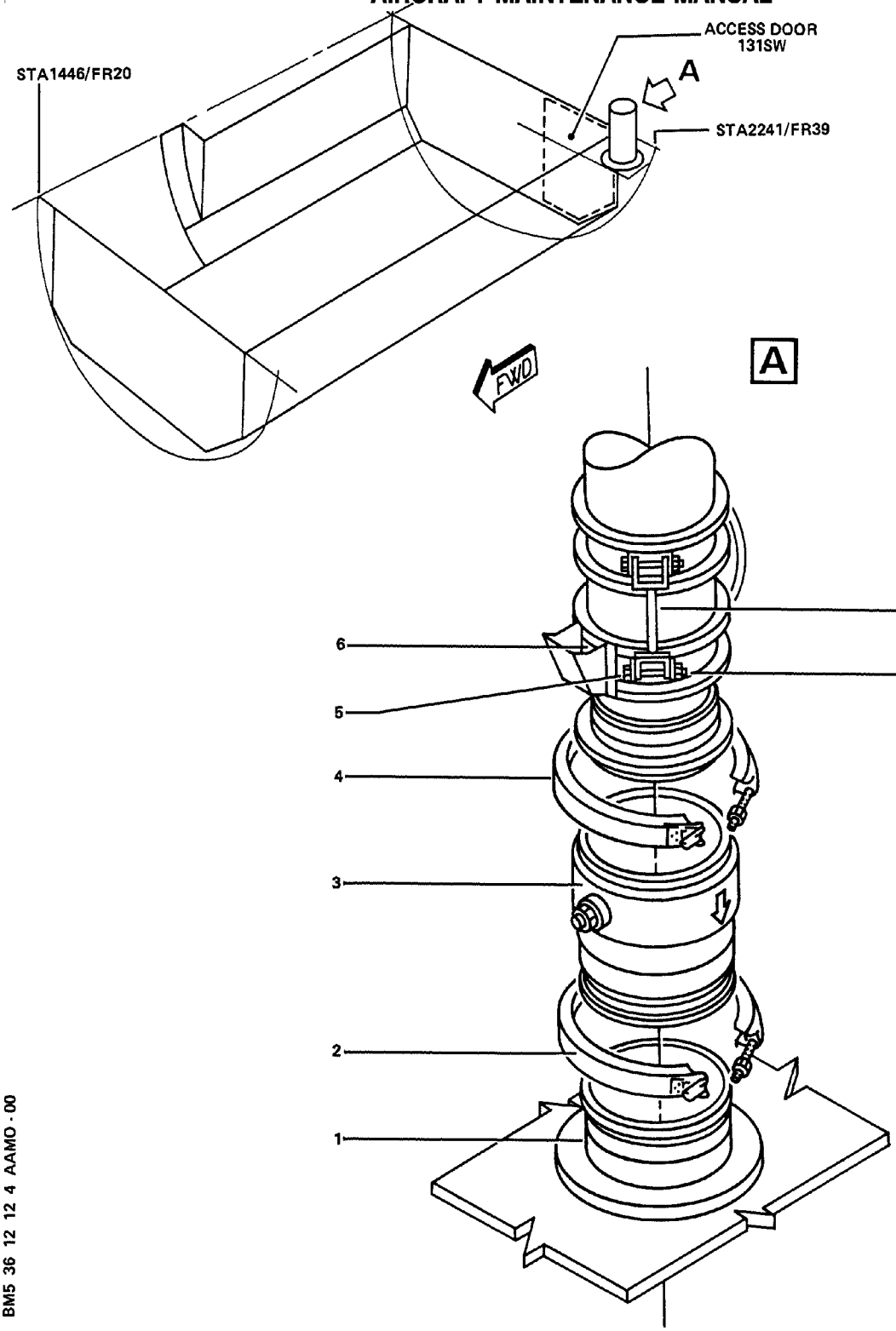
Referenced Procedure	
- 52-33-00, P. Block 1	Cargo Compartment Door Opening

2. Procedure

A. Job Set-Up
(1) Position access platform at forward cargo compartment door and open door. (Ref. 52-33-00, P. Block 1).
(2) Open access door 131SW.

B. Removal
(Ref. Fig. 401)
CAUTION : DURING REMOVAL/INSTALLATION PROCEDURES PRECAUTIONS MUST BE TAKEN TO AVOID DAMAGING OVERHEAT SENSING ELEMENTS.
(1) Remove clamp (4).
(2) Remove bolts (5) and nuts (8).
(3) Remove clamp (2).
(4) Slide duct (6) upwards and remove valve (3).
(5) Cap open ends of ducts (1) and (6).

C. Installation
(1) Remove blanking caps/plugs from ducts (1) and (6). Check for correct condition of duct (1) and (6) flanges.
(2) Slide duct (6) upwards and install valve (3) with arrow indicating airflow direction pointing downwards.
(3) Install clamps (4) and (2); do not tighten at this stage. Position valve (3) to enable rod (7) installation.
(4) Tighten clamps (4) and (2); TORQUE to the value given on clamps.
(5) Install rod (7), bolts (5) and nuts (8).
NOTE : If necessary, adjust rod (7) as required to enable ready installation of bolt (5).



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APU Bleed Check Valve
Figure 401

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 131SW.
(3)Close cargo compartment door (Ref. 52-33-00, P. Block 1) and remove access platform.
(4)Remove warning notices.

APU BLEED CHECK VALVE - INSPECTION/CHECK

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- **MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED.**
- **DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM.**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START-UP.**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Warning Notices
Referenced Procedures	
- 52-33-00, P. Block 1	Cargo Compartment Door Opening
- 36-12-12, P. Block 401	APU Bleed Check Valve

2. Procedure

A. Job Set-Up
(1) Position access platform at forward cargo compartment door and open door (Ref. 52-33-00, P. Block 1).
(2) Open access door 131SW.
(3) Remove APU bleed check valve (Ref. 36-12-12, P. Block 401).

B. Inspection/Check
(1) Check valve for correct condition, particularly flaps and hinge pin, for dents, scores and corrosion traces.
(2) Check that flaps move freely without friction or binding during opening phase.

C. Close-Up
(1) Install APU bleed check valve (Ref. 36-12-12, P. Block 401).
(2) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(3) Close access door 131SW.
(4) Close cargo compartment door (Ref. 52-33-00, P. Block 1).
(5) Remove access platform.
(6) Remove warning notices.

GROUND COMPRESSED AIR SUPPLY SYSTEM - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)
   The whole system is designed to supply on the ground the various pneumatic systems by means of the HP ground air supply units.
   The system ensures :
   - supply to the refrigeration unit packs
   - engine starting
   - hydraulic reservoir pressurization.

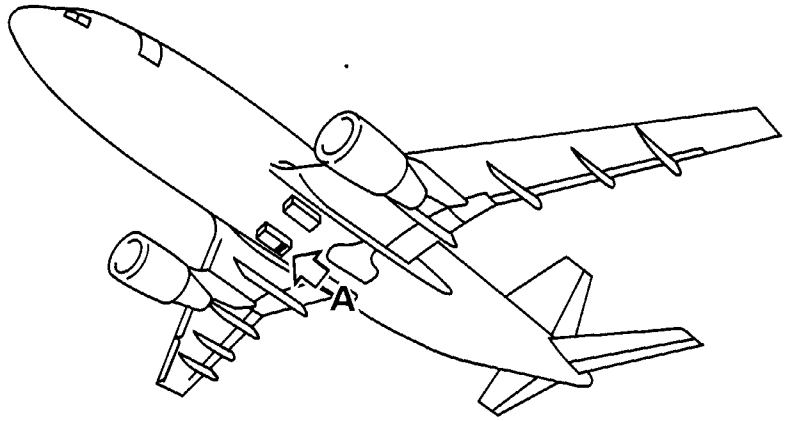
2. Component Location

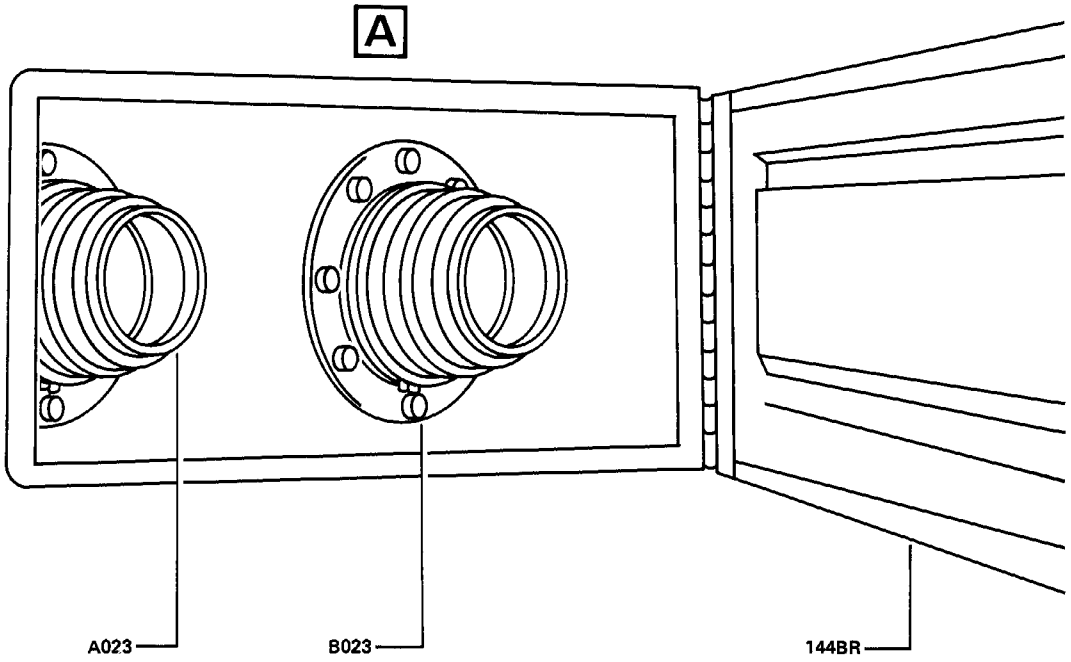
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
A023	Ground Connector-HP		140	144BR	36-13-11
B023	Ground Connector-HP		140	144BR	36-13-11

(Ref. Fig. 001)

3. Air Bleed

Air supply is achieved through two 3 in. dia. HP ground connectors located in the right cooling air inlet.
Each connector is equipped with a built-in nipple check valve assembly. Both HP ground connectors are directly connected to the crossfeed duct, at the crossfeed valve left side, by a single ducting.





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HP Ground Connectors
Figure 001

HP GROUND CONNECTOR - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON PNEUMATIC SYSTEM :
- **MAKE CERTAIN THAT PNEUMATIC SYSTEM IS DEPRESSURIZED**
- **DISPLAY A WARNING NOTICE ON HP GROUND CONNECTORS PROHIBITING PRESSURIZATION OF PNEUMATIC SYSTEM**
- **DISPLAY A WARNING NOTICE PROHIBITING ENGINE START UP**
- **DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF APU BLEED SWITCH PLACED IN OFF/R POSITION.**

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Blanking Plugs/Caps
C.	Gasket
D.	Warning Notices

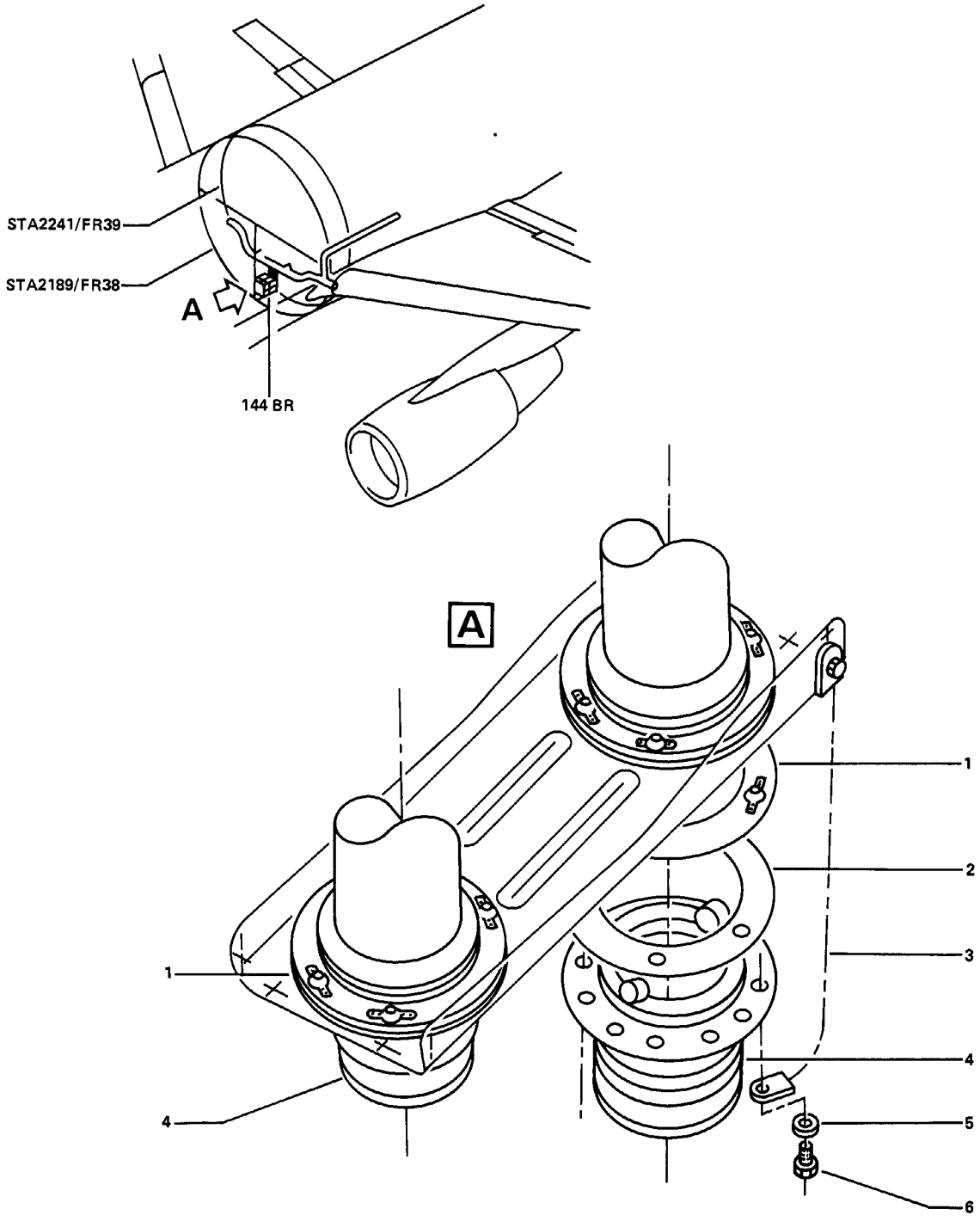
2. Procedure

A. Job Set-Up
(1)Position access platform at access door 144BR.
(2)Open access door 144BR.

B. Removal
(1)Remove bolts (6), washers (5), disconnect bonding strip (3) and remove HP ground connector (4).
(2)Remove gasket (2) ; discard if necessary.
(3)Cap duct (1) open ends.

C. Installation
(1)Remove blanking plug/cap from duct (1).
(2)Install gasket (2).
(3)Install HP ground connector (4) on duct (1) mounting base ; connect bonding strip (3) ; install and tighten bolts (6) equipped with washers (5).
(Ref. Fig. 401)

D. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 144BR.
(3)Remove access platform.
(4)Remove warning notices.

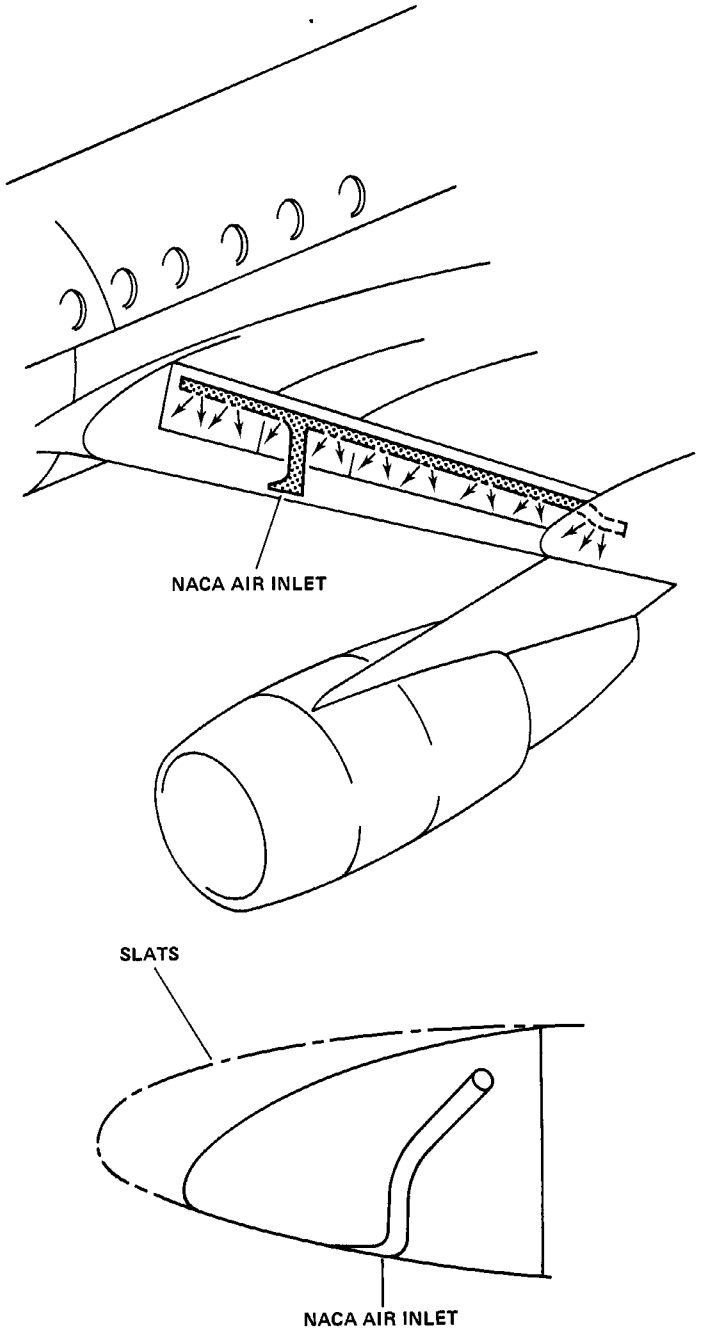


BM5 36 13 11 4 ABMO - 11

HP Ground Connector
Figure 401

WING LEADING EDGE AIR COOLING - DESCRIPTION AND OPERATION

1. General (Ref. Fig. 001)
   Ventilation of the wing leading edge section, located between the engine pylon and the fuselage, is ensured, in flight only by a NACA type ram air inlet circulating ram air and supplying a piccolo tube for distribution of air to the spar box in which the air bleed ducts are located.
   No monitoring or manual control is provided.



BM5 36 14 00 0 AAMO
DM5

Wing Leading Edge Air Cooling
Figure 001

1. General

Parameters relative to air bleed system operation (regulated pressures and temperatures, valve position) are displayed on the right **ECAM** display unit (display selected by pressing **BLEED** pushbutton switch on the **ECAM** control panel).

The pneumatic system indicating is mainly ensured by a pressure indicator **(AIR BLEED/PRESS)** on the overhead panel and a temperature indicator **(PRECOOLER OUTLET TEMP)** on the maintenance panel which enable the crew to :

- monitor air temperature and pressure controlled by the air bleed system downstream of the precooler.
- determine, in conjunction with the information displayed on the left and right **ECAM** display units, the corrective action to take in the event of illumination of annunciator lights associated with the air bleed system.
- control engine starting air supply pressure.

The ambient overheat detection system senses and signals any leakage or rupture in air supply ducts, and automatically shuts off the associated air bleeds.

R **ON A/C 101-200,

(Ref. Fig. 001)

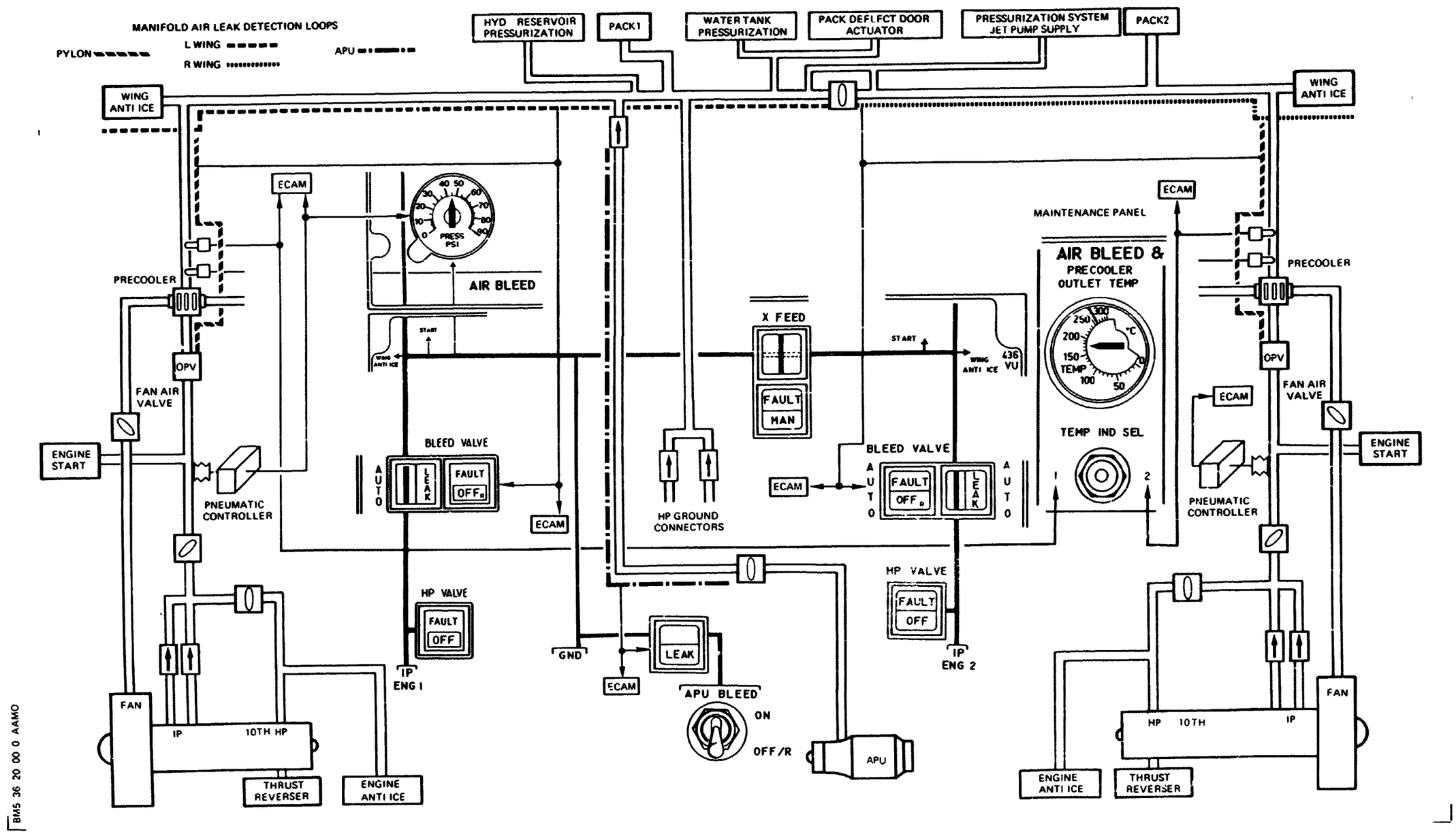
R **ON A/C 001-100,

(Ref. Fig. 002)

R **ON A/C ALL

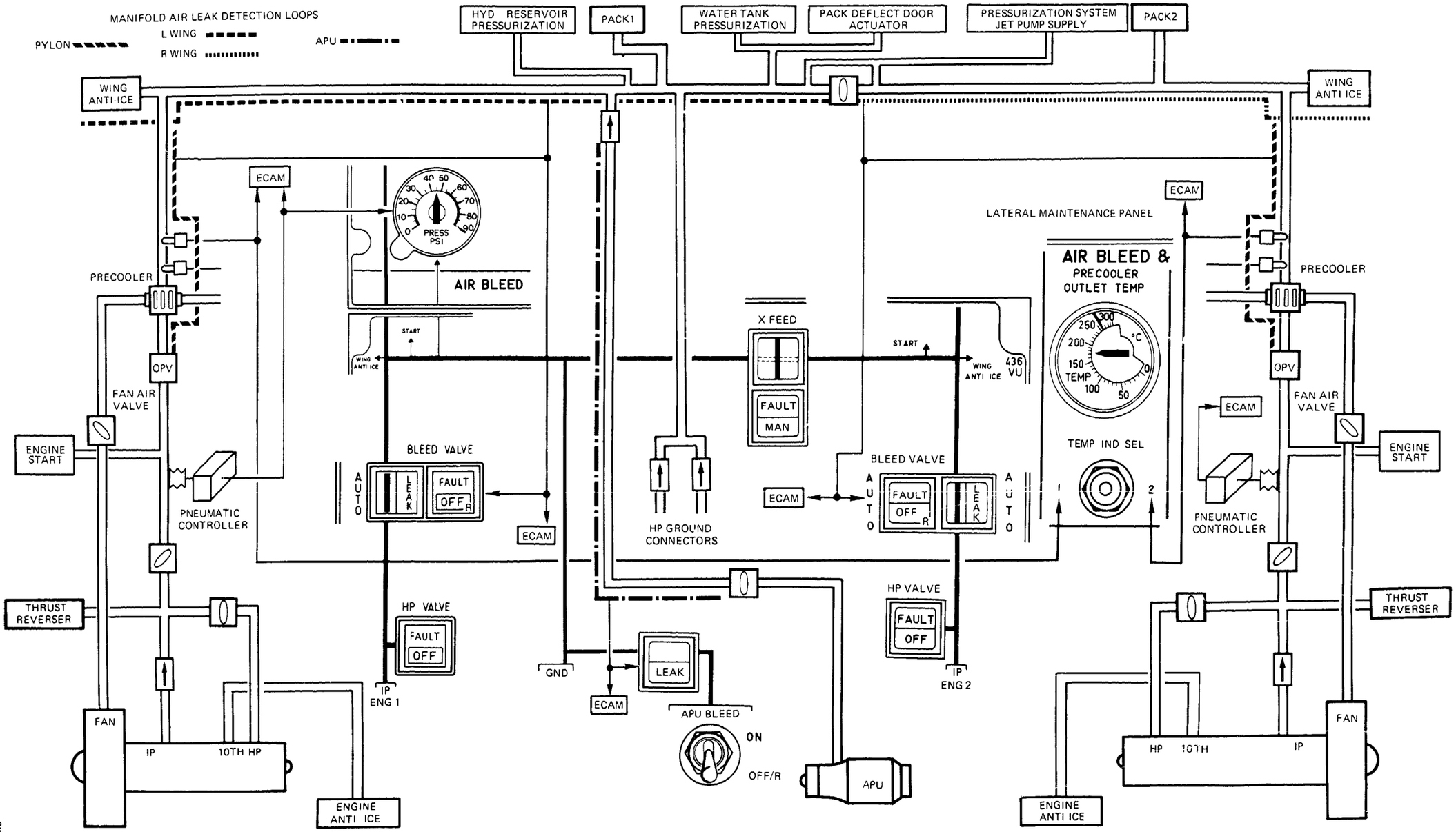
(Ref. Fig. 003)

INTENTIONALLY BLANK



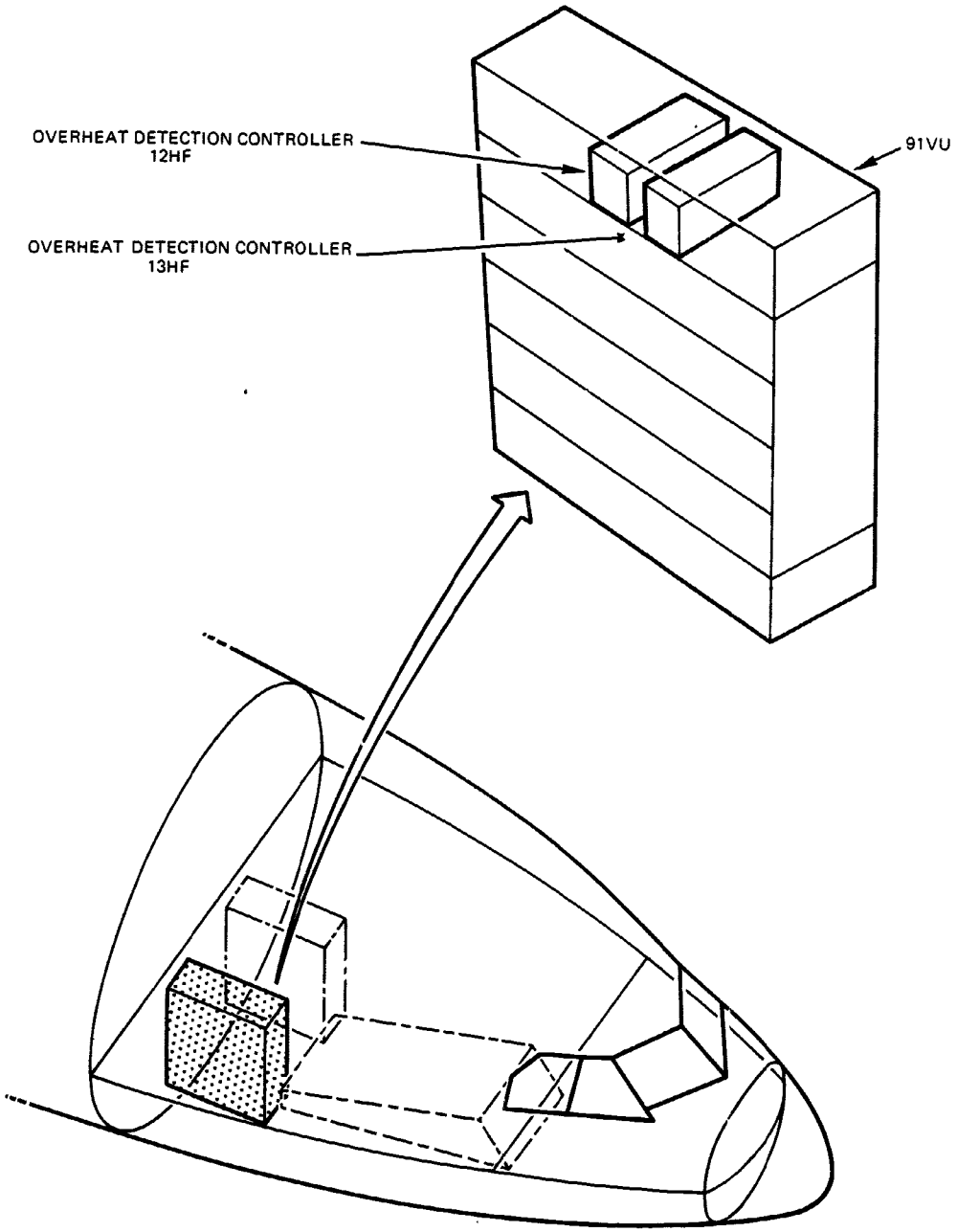
BM5 36 20 00 0 AAMO

Indicating - Schematic
Figure 001



BM5 36 20 00 0 ACPO · 13 · 08
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Indicating - Schematic
Figure 002



BM5 36 20 00 0 AEMO

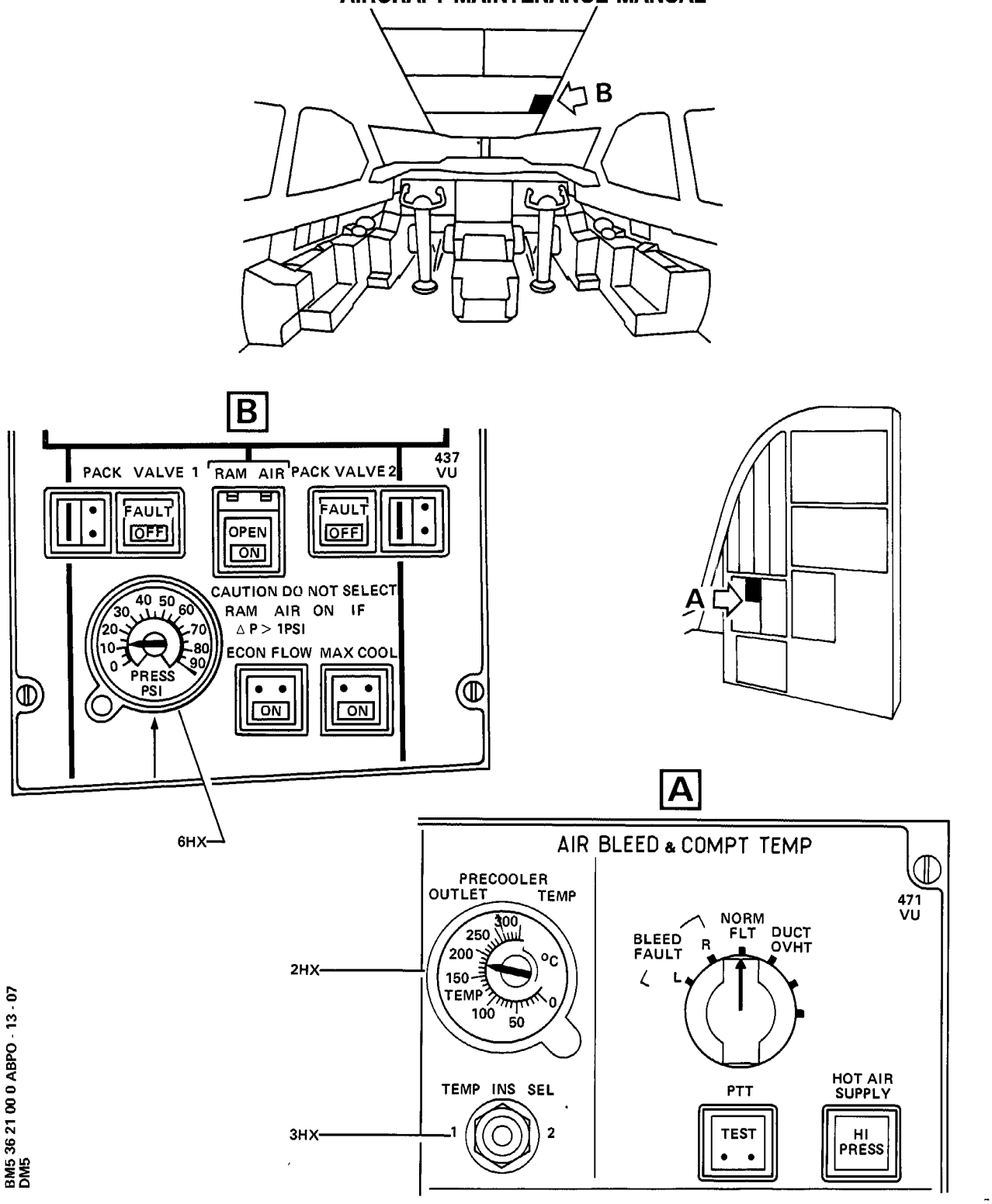
Overheat Detection Controller - Location
Figure 003

BLEED AIR PRESSURE AND TEMPERATURE INDICATING - DESCRIPTION AND OPERATION

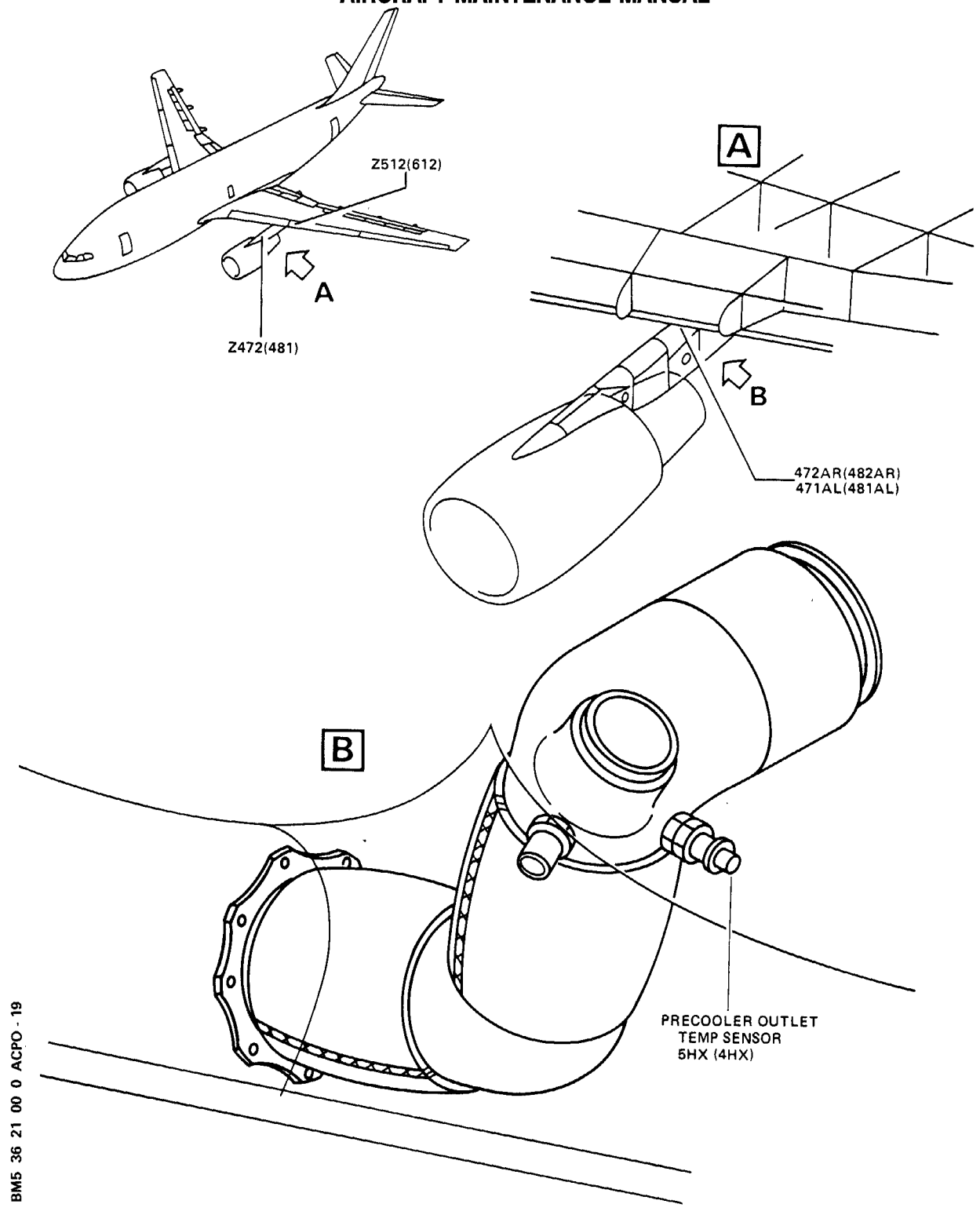
1. General (Ref. Fig. 003)
   Engine bleed air pressure and temperature are monitored by a pressure indicator (AIR BLEED/PRESS) located on the overhead panel and a temperature indicator (PRECOOLER OUTLET TEMP) located on the maintenance panel.

2. Component Location
   (Ref. Fig. 001)
   (Ref. Fig. 002)

	FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
R	2HX	IND - PRECOOLER OUTLET TEMP	471VU	212		36-21-11
	3HX	SWITCH - PRECOOLER TEMP IND SEL	471VU	212		36-21-00
	4HX	SENSOR - PRECOOLER OUTLET TEMPERATURE, 2		481	471AL 481AL	36-21-13
	5HX	SENSOR - PRECOOLER OUTLET TEMPERATURE, 1		472	472AR 482AR	36-21-13
R	6HX	IND - AIR BLEED PRESS	437VU	211		36-21-12



Control and Indicating - Location
Figure 001



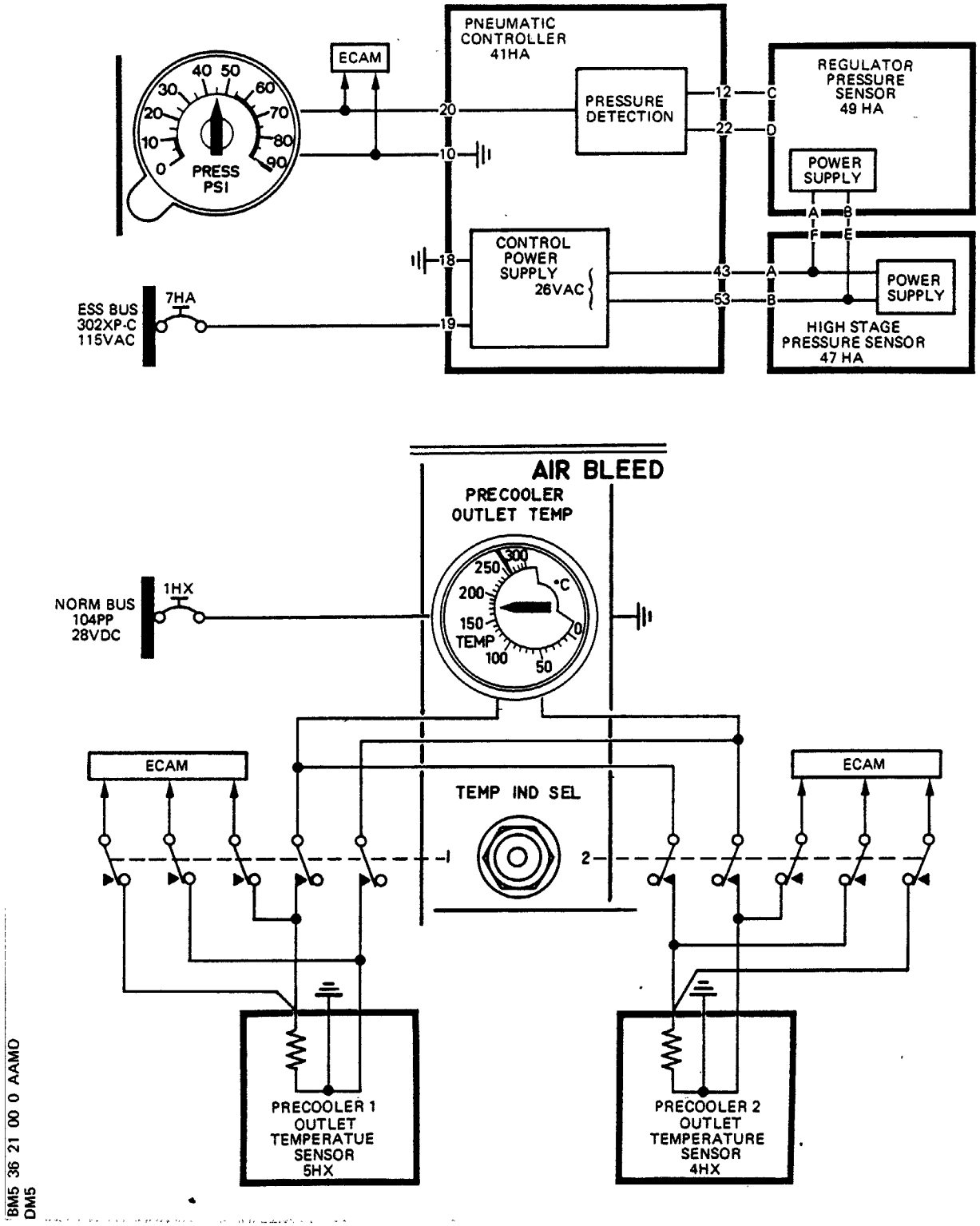
Sensors - Location
Figure 002

3. Pressure Indication

AIR BLEED/PRESS
indicator reads pressure controlled by the left air bleed system only. Air pressure downstream of the bleed valve is sensed by the regulator pressure sensor ; the information is fed to the pneumatic system 1 controller which processes an electrical signal for transmission to the indicator. The indicator operates on the moving coil galvanometer principle. Downstream pressure and pressure prevailing in the whole crossfeed duct when the crossfeed valve is open, are more or less similar.

4. Temperature Indication

Temperature controlled by the left and right air bleed systems is read on one indicator only **(PRECOOLER OUTLET TEMP)**, located on the maintenance panel. This temperature indicator is associated with **TEMP IND SEL** switch enabling selection of the right (2) or left (1) system, depending on the required indication. The positions 1 and 2 are momentary (the switch is spring-loaded to neutral) and cancel the corresponding indications on the **ECAM** display unit.
The **PRECOOLER OUTLET TEMP** indicator receives an electrical signal directly from a built-in resistor sensor designated precooler outlet temperature sensor, located at the precooler outlet and forming a branch of a Wheatstone bridge.



Bleed Air Pressure and Temperature Indicating
Figure 003

PRECOOLER OUTLET TEMPERATURE INDICATOR - REMOVAL/INSTALLATION

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 31-51-00, P. Block 201	ECAM System

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that the ventilation of the electronics racks is correct.
(3)Open, safety and tag the following circuit breaker:

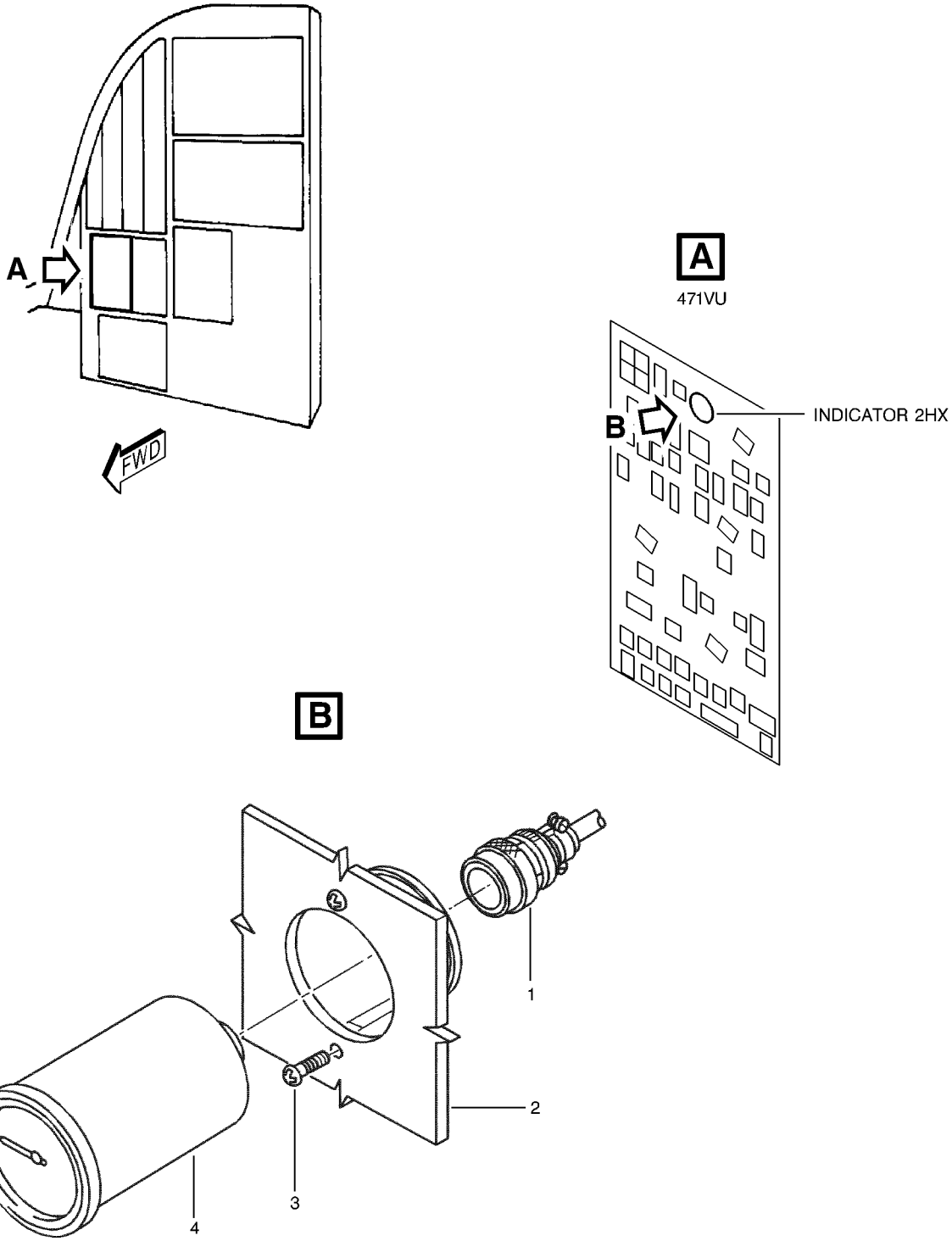
PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED & COMPT TEMP/PRECOOLER OUTLET TEMP IND	1HX	311/H52

B. Removal
(Ref. Fig. 401)
(1)Loosen the screw (3).
(2)Pull the indicator (4) out of the panel (2).
(3)Disconnect the electrical connector (1) from the indicator (4).
(4)Install a blanking cap on the disconnected electrical connector.

C. Preparation of the Replacement Component
(1)Clean the component interface and/or the adjacent area.
(2)Inspect the component interface and/or the adjacent area.

D. Installation
(1)Remove the blanking cap from the electrical connector (1).
(2)Make certain that the electrical connector is clean and in correct condition.
(3)Connect the electrical connector (1) to the indicator (4).
(4)Install and align the indicator (4) in the panel (2).
(5)Tighten the screw (3).

E. Test
(1)Remove the safety clip and tag and close the circuit breaker 1HX.
(2)Do the ECAM start procedure (Ref. 31-51-00, P. Block 201).
(3)On the ECAM control panel:
(a)Press the BLEED pushbutton switch.
(b)On the R ECAM display unit, the BLEED page appears and shows the engine 1 and engine 2 bleed air temperature.



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Precooler Outlet Temperature Indicator
Figure 401

(c)Record the corresponding temperature values.
(4)On the AIR BLEED & COMPT TEMP section of the panel 471VU:
(a)Set the TEMP IND SEL switch to position 1 for the engine 1.
(b)Read and record the value shown on the temperature indicator.
(c)Set the TEMP IND SEL switch to position 2 for the engine 2.
(d)Read and record the value shown on the temperature indicator.
(5)Check that the values shown on the temperature indicator and on the R ECAM display unit are the same.
(6)Do the ECAM stop procedure (Ref. 31-51-00, P. Block 201).

F. Close-Up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

**ON A/C 001-100,

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 31-51-00, P. Block 201	ECAM System
- 71-00-00, P. Block 501	Power Plant - General

**ON A/C 101-200,

1. Equipment and Materials

ITEM	DESIGNATION
A.	Blanking Cap
B.	Circuit Breaker Safety Clip
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 31-51-00, P. Block 201	ECAM System
- 71-00-00, P. Block 201	Power Plant - General

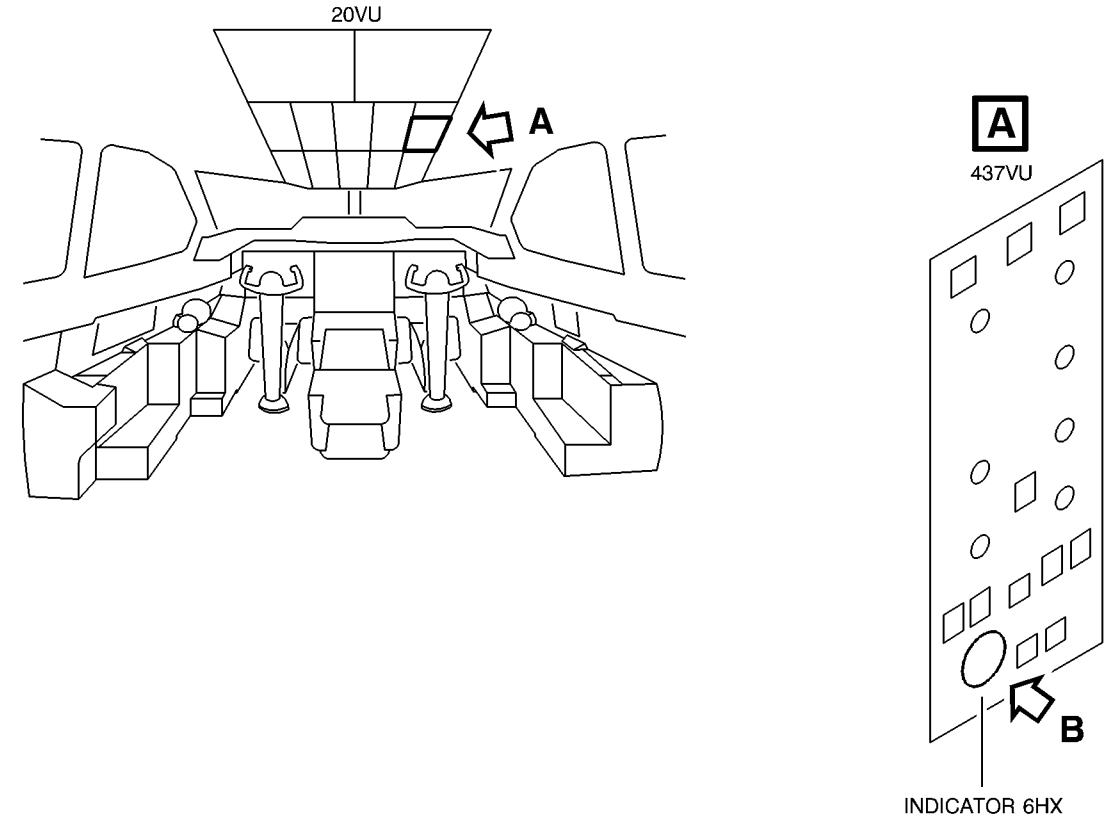
**ON A/C ALL

2. Procedure

A. Job Set-Up
(1)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(2)Make certain that the ventilation of the electronics racks is correct.
(3)Open, safety and tag the following circuit breaker:

PANEL	SERVICE	IDENT.	LOCATION
22VU	AIR BLEED/ENG 1 CONTROLLER/CTL	7HA	209/A18

B. Removal
(Ref. Fig. 401)
(1)Loosen the screw (3).
(2)Pull the indicator (4) out of the panel (2).
(3)Disconnect the electrical connector (1) from the indicator (4).



Bleed Air Pressure Indicator
Figure 401

(4)Install a blanking cap on the disconnected electrical connector.

C. Preparation of the Replacement Component
(1)Clean the component interface and/or the adjacent area.
(2)Inspect the component interface and/or the adjacent area.

D. Installation
(1)Remove the blanking cap from the electrical connector (1).
(2)Make certain that the electrical connector is clean and in correct condition.
(3)Connect the electrical connector (1) to the indicator (4).
(4)Install and align the indicator (4) in the panel (2).
(5)Tighten the screw (3).

**ON A/C 001-100,

E. Test
(1)Remove the safety clip and tag and close the circuit breaker 7HA.
(2)Do an engine run (Ref. 71-00-00, P. Block 501).
(3)Do the ECAM start procedure (Ref. 31-51-00, P. Block 201).
(4)On the ECAM control panel:
(a)Press the BLEED pushbutton switch.
(b)On the R ECAM display unit, the BLEED page appears and shows the engine 1 and engine 2 bleed air pressure indications.
(c)Record the engine 1 pressure value.
(5)Check that the values shown on the pressure indicator and on the R ECAM display unit are the same.
(6)Do the ECAM stop procedure (Ref. 31-51-00, P. Block 201).
(7)Shutdown the engine (Ref. 71-00-00, P. Block 501).

**ON A/C 101-200,

E. Test
(1)Remove the safety clip and tag and close the circuit breaker 7HA.
(2)Do an engine run (Ref. 71-00-00, P. Block 201).
(3)Do the ECAM start procedure (Ref. 31-51-00, P. Block 201).
(4)On the ECAM control panel:
(a)Press the BLEED pushbutton switch.
(b)On the R ECAM display unit, the BLEED page appears and shows the engine 1 and engine 2 bleed air pressure indications.
(c)Record the engine 1 pressure value.
(5)Check that the values shown on the pressure indicator and on the R ECAM display unit are the same.
(6)Do the ECAM stop procedure (Ref. 31-51-00, P. Block 201).
(7)Shutdown the engine (Ref. 71-00-00, P. Block 201).

**ON A/C ALL

F. Close-Up
(1)Make certain that the working area is clean and clear of tools and miscellaneous items of equipment.
(2)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

PRECOOLER OUTLET TEMPERATURE SENSOR (4HX, 5HX) - REMOVAL/INSTALLATION

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON THE PNEUMATIC SYSTEM:
WARNING : - MAKE CERTAIN THAT THE PNEUMATIC SYSTEM IS DEPRESSURIZED.
WARNING : - DISPLAY WARNING NOTICE ON GROUND POWER CONNECTIONS PROHIBITING PRESSURIZATION OF THE PNEUMATIC SYSTEM.
WARNING : - DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THE APU BLEED LOAD VALVE CONTROL SWITCH PLACED IN "CLOSE RESET" POSITION.
WARNING : - DISPLAY A WARNING NOTICE PROHIBITING OPERATION OF THE ENGINES.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform, 4 m (13 ft.)
B.	Protective Cap
C.	Blank for Adapter Orifice (1.0625 - 12 UNJ)
D.	Circuit Breaker Safety Clips and Tags
E.	O-Ring
F.	Lockwire, Corrosion-Resistant Steel, Dia. 0.6 mm (0.02 in.)

Referenced Procedure	
- 36-11-00, P. Block 501	Engine Bleed Air Supply System

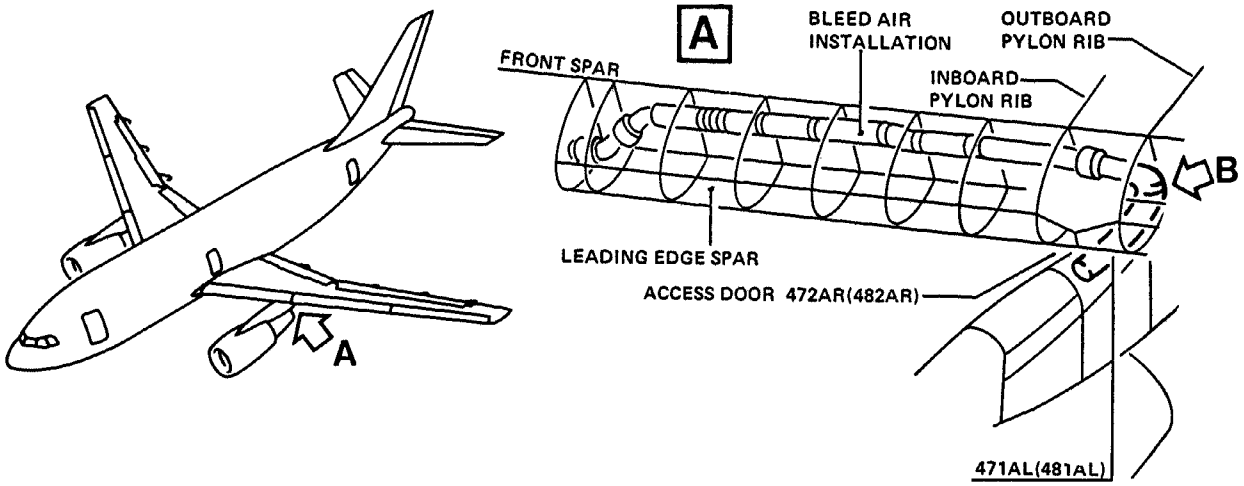
2. Procedure

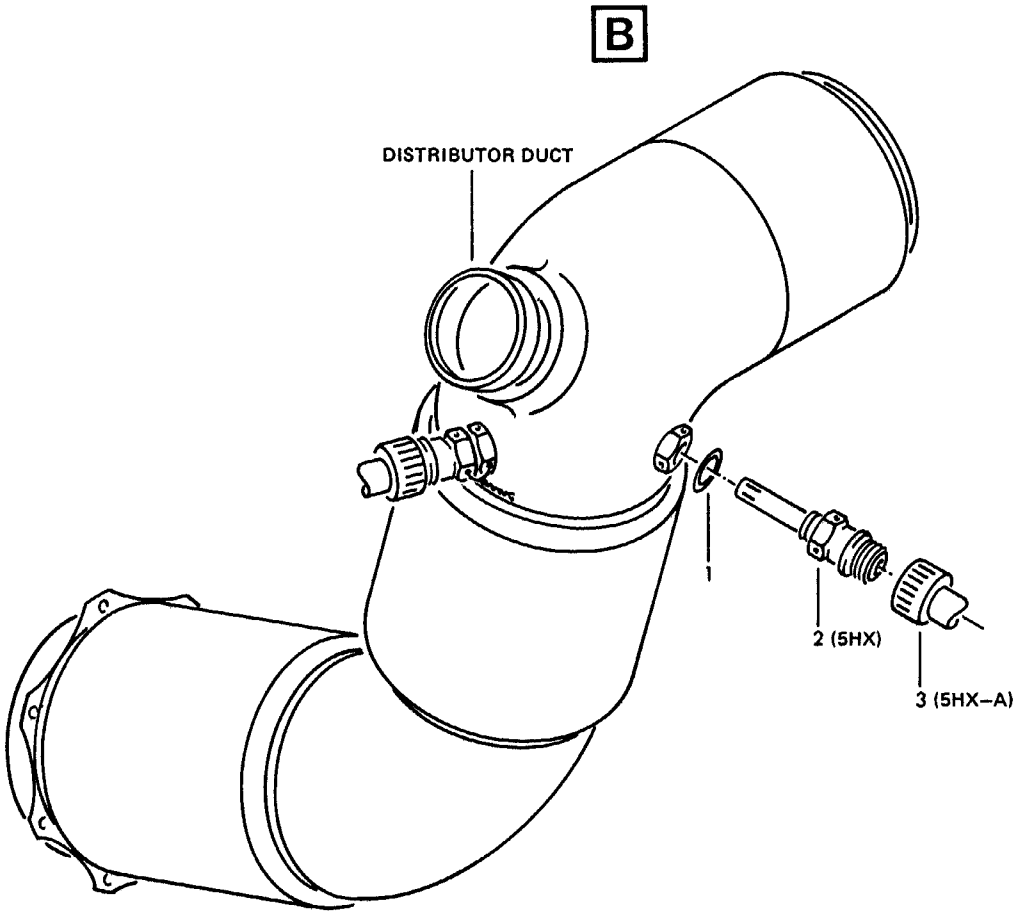
A. Job Set-Up
(1)Open, safety and tag the following circuit breakers:

PANEL	SERVICE	IDENT.	LOCATION
131VU	AIR BLEED - COMPT TEMP/VALVES/ENG1 VALVES/HP	3HA	311/K53
131VU	AIR BLEED - COMPT TEMP/ENG2/VALVES/HP	4HA	312/G53
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/CTL	8HA	315/D53
131VU	AIR BLEED - COMPT TEMP/ENG2/CONTROLLER/ MONITOR	6HA	315/D54
22VU	AIR BLEED/ENG1 CONTROLLER/MONITOR	5HA	209/A17
22VU	AIR BLEED/ENG1 CONTROLLER/CTL	7HA	209/A18

(2)Position access platform (zone 472 (482)).
(3)Open access door 472AR (482AR).

B. Removal
(Ref. Fig. 401)
(1)Disconnect electrical connector 5HX-A (4HX-A) (3) and install protective cap.
(2)Remove lockwire from precooler outlet temperature sensor 5HX (4HX) (2).
(3)Remove precooler outlet temperature sensor 5HX (4HX) (2) with O-Ring (1). Discard O-ring.
(4)Install blank at duct adapter orifice.





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Precooler Outlet Temperature Sensor 5HX (4HX)
Figure 401

C. Installation
(1)Install new O-ring (1) on precooler outlet temperature sensor 5HX (4HX) (2).
(2)Remove blank from duct adapter orifice.
(3)Install precooler outlet temperature sensor 5HX (4HX) (2) in duct adapter.
(4)TORQUE to between 0.3 and 4.2 m.daN (2.21 and 30.98 lbf.ft.).
(5)Secure precooler outlet temperature sensor 5HX (4HX) with lockwire.
(6)Remove protective caps and connect electrical connector 5HX-A (4HX-A) (3).
(7)Remove safety clips and tags and close circuit breakers 3HA, 4HA, 5HA, 6HA, 7HA and 8HA.

D. Test
(1)Perform operational test (BITE test using test selector switch) on pneumatic system controller 41HA (42HA) (Ref. 36-11-00, P. Block 501).

E. Close-Up
(1)Make certain that work area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 472AR (482AR).
(3)Remove access platform.

MANIFOLD AIR LEAK DETECTION - DESCRIPTION AND OPERATION

1. General

This continuous monitoring system is designed to detect, by means of detection loops, any ambient overheat, to protect the structures and components in the vicinity of the hot air ducts in the fuselage, pylons and wings, on which leaks or bursts may possibly occur.

2. Component Location

(Ref. Fig. 001)
(Ref. Fig. 002)
(Ref. Fig. 003)
(Ref. Fig. 004)

R A. Control and Indicating

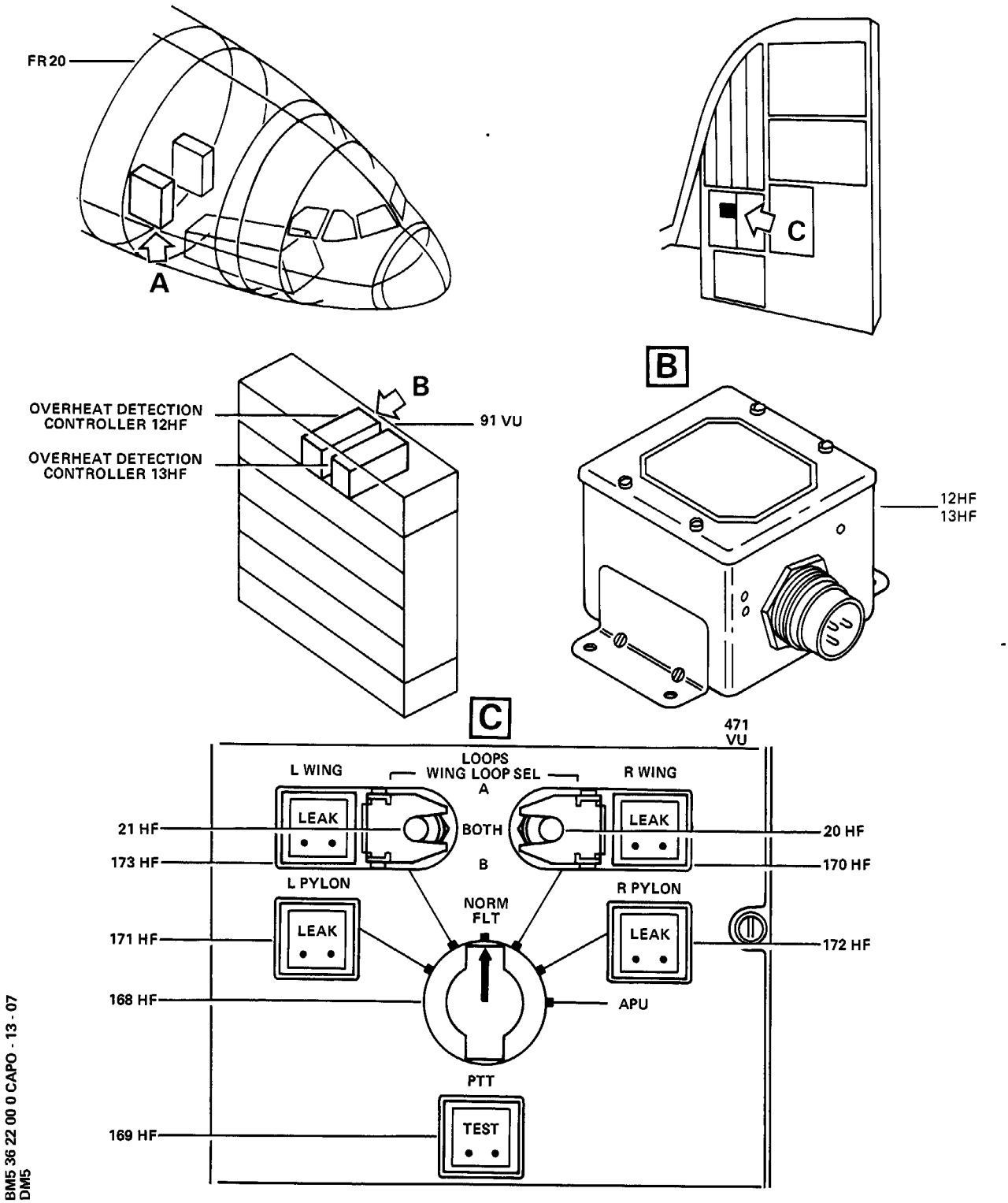
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
12HF	CONTROLLER-OVHT DETECTION, 2	91VU	122	121BL	36-22-00
13HF	CONTROLLER-OVHT DETECTION, 1	91VU	122	121BL	36-22-00
20HF	SWITCH-R WING LOOP SEL	471VU	212		36-22-00
21HF	SWITCH-L WING LOOP SEL	471VU	212		36-22-00
R 168HF	SWITCH-LOOPS TEST SELECTOR	471VU	212		36-22-00
R 169HF	P/BSW-LOOPS/PTT	471VU	212		36-22-00
R 170HF	MFA-LOOPS/R WING/LEAK	471VU	212		36-22-00
R 171HF	MFA-LOOPS/L PYLON/LEAK	471VU	212		36-22-00
R 172HF	MFA-LOOPS/R PYLON/LEAK	471VU	212		36-22-00
R 173HF	MFA-LOOPS/L WING/LEAK	471VU	212		36-22-00

R B. Wing Section

R FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
R 35HF	SENSING ELEMENT-OVERHEAT		512	FAIRING STRIPS BETWEEN RIB2/ RIB7	36-22-12
R 36HF	SENSING ELEMENT-OVERHEAT		612	FAIRING STRIPS BETWEEN RIB2/ RIB7	36-22-12
R 37HF	SENSING ELEMENT-OVERHEAT		512	512DB, EB, FB HB, JB	36-22-12
R 38HF	SENSING ELEMENT-OVERHEAT		612	612DB, EB, FB HB, JB	36-22-12
R 41HF	SENSING ELEMENT-OVERHEAT		512	512AT,	36-22-12

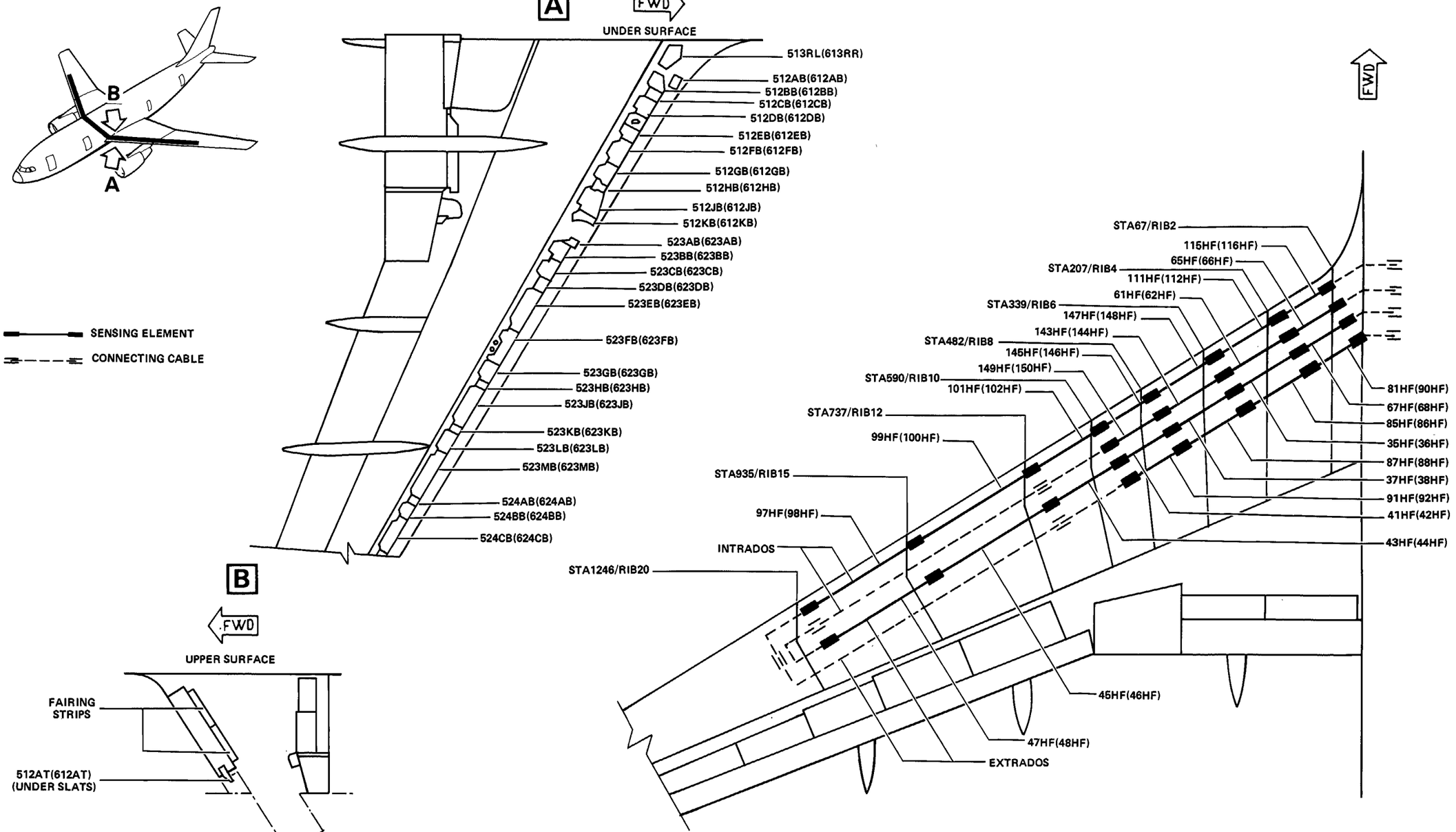
FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
				JB, KB,	
			523	523AB,	
				BB	
42HF	SENSING ELEMENT-OVERHEAT		612	612AT,	36-22-12
				JB, KB	
			623	623AB,	36-22-12
				BB,	
43HF	SENSING ELEMENT-OVERHEAT		523	523BB,	36-22-12
				CB	
44HF	SENSING ELEMENT-OVERHEAT		623	623BB,	36-22-12
				CB	
45HF	SENSING ELEMENT-OVERHEAT		523	523JB,	36-22-12
				MB	
46HF	SENSING ELEMENT-OVERHEAT		623	623JB,	36-22-12
				MB	
47HF	SENSING ELEMENT-OVERHEAT		524	524AB,	36-22-12
				BB, CB	
48HF	SENSING ELEMENT-OVERHEAT		624	624AB,	36-22-12
				BB, CB	
61HF	SENSING ELEMENT-OVERHEAT		512	512BB,	36-22-12
				DB, EB,	
				FB	
62HF	SENSING ELEMENT-OVERHEAT		612	612BB,	36-22-12
				DB, EB,	
				FB	
65HF	SENSING ELEMENT-OVERHEAT		512	513RL	36-22-12
66HF	SENSING ELEMENT-OVERHEAT		612	613RR	36-22-12
67HF	SENSING ELEMENT-OVERHEAT		512	513RL	36-22-12
68HF	SENSING ELEMENT-OVERHEAT		612	613RR	36-22-12
81HF	SENSING ELEMENT-OVERHEAT		512	513RL	36-22-12
85HF	SENSING ELEMENT-OVERHEAT		512	FAIRING STRIPS BETWEEN RIB2/ RIB7	36-22-12
86HF	SENSING ELEMENT-OVERHEAT		612	FAIRING STRIPS BETWEEN RIB2/ RIB7	36-22-12
87HF	SENSING ELEMENT-OVERHEAT		512	512DB,	36-22-12
				EB, FB,	
				HB, JB	
88HF	SENSING ELEMENT-OVERHEAT		612	612DB,	36-22-12
				EB, FB,	
				HB, JB	
90HF	SENSING ELEMENT-OVERHEAT		612	613RR	36-22-12
91HF	SENSING ELEMENT-OVERHEAT		512	512AT,	36-22-12

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
				JB, KB	
			523	523AB, BB	
92HF	SENSING ELEMENT-OVERHEAT		612	612AT, JB, KB	36-22-12
			623	623AB, BB	
97HF	SENSING ELEMENT-OVERHEAT		524	524AB, BB, CB	36-22-12
98HF	SENSING ELEMENT-OVERHEAT		624	624AB, BB, CB	36-22-12
99HF	SENSING ELEMENT-OVERHEAT		523	523JB, MB	36-22-12
100HF	SENSING ELEMENT-OVERHEAT		623	623JB, MB	36-22-12
101HF	SENSING ELEMENT-OVERHEAT		523	523BB, CB	36-22-12
102HF	SENSING ELEMENT-OVERHEAT		623	623BB, CB	36-22-12
111HF	SENSING ELEMENT-OVERHEAT		512	512BB, DB, EB FB	36-22-12
112HF	SENSING ELEMENT-OVERHEAT		612	612BB, DB, EB FB	36-22-12
115HF	SENSING ELEMENT-OVERHEAT		512	512RL	36-22-12
116HF	SENSING ELEMENT-OVERHEAT		612	613RR	36-22-12
143HF	SENSING ELEMENT-OVERHEAT		512	512GB, JB	36-22-12
144HF	SENSING ELEMENT-OVERHEAT		612	612GB, JB	36-22-12
145HF	SENSING ELEMENT-OVERHEAT		512	512AT, KB	36-22-12
			523	523AB	
146HF	SENSING ELEMENT-OVERHEAT		612	612AT, KB	36-22-12
			623	623AB	36-22-12
147HF	SENSING ELEMENT-OVERHEAT		512	512GB JB	36-22-12
148HF	SENSING ELEMENT-OVERHEAT		612	612GB, JB	36-22-12
149HF	SENSING ELEMENT-OVERHEAT		512	512AT, KB	36-22-12
			523	523AB	
150HF	SENSING ELEMENT-OVERHEAT		612	612AT, KB	36-22-12
			623	623AB	



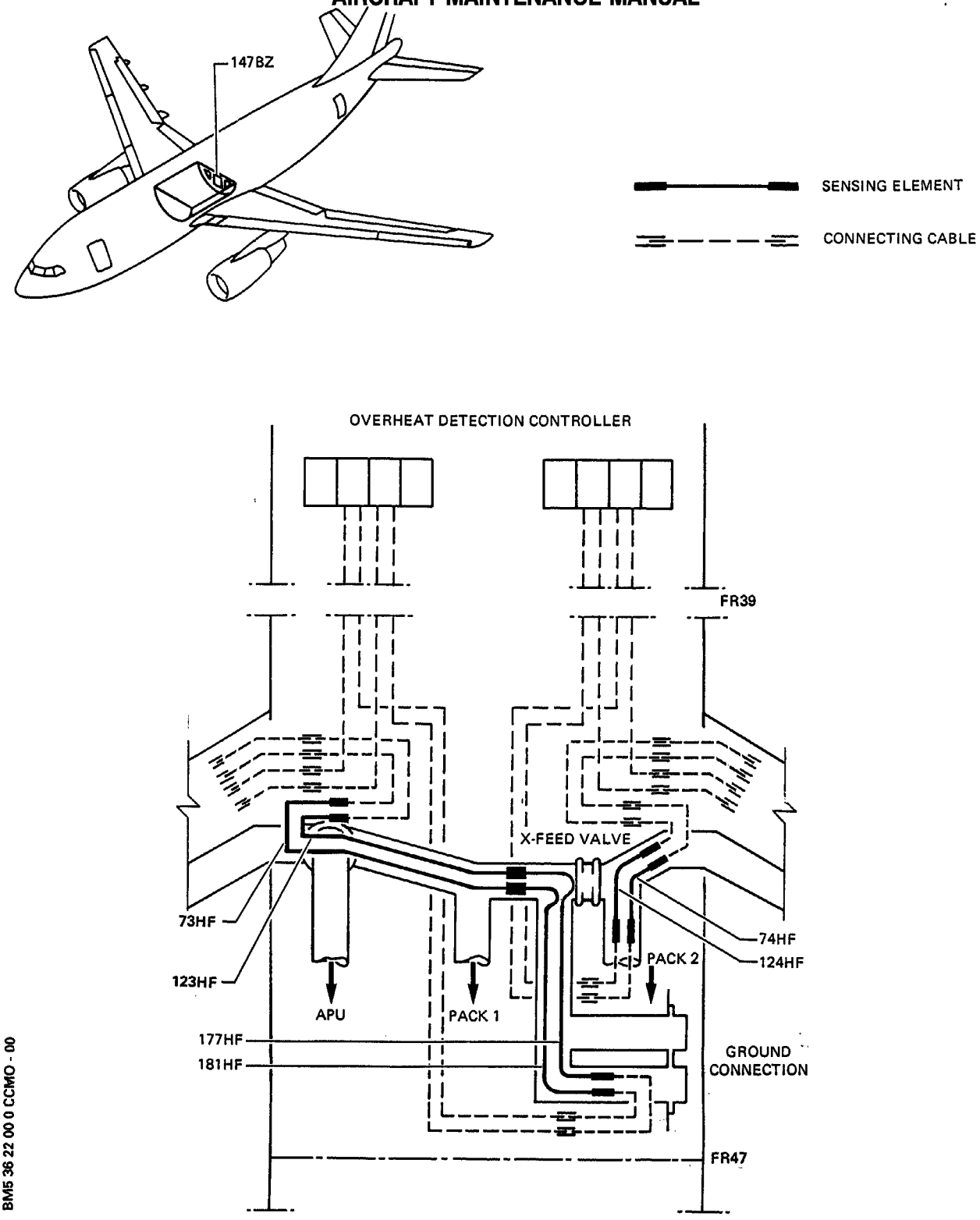
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DM5

Controls and Indicating - Location
Figure 001

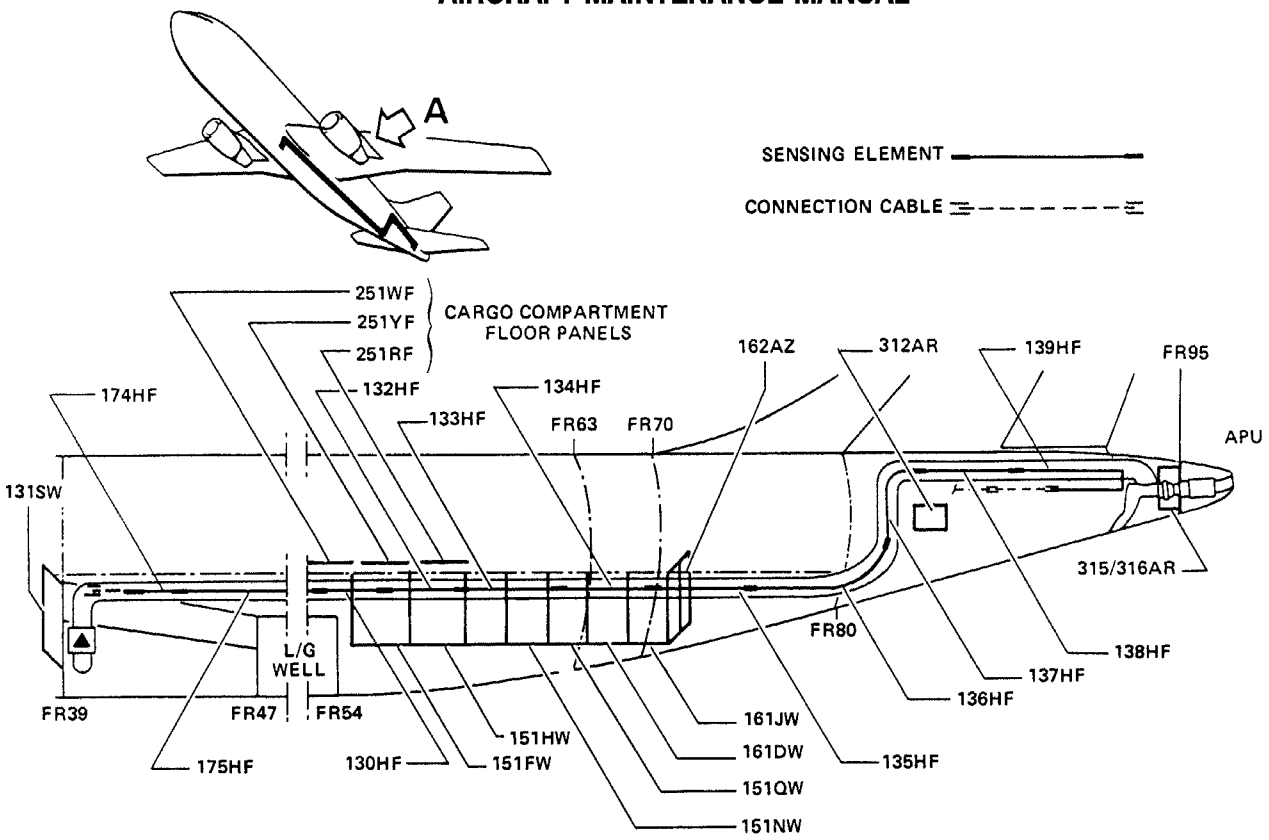


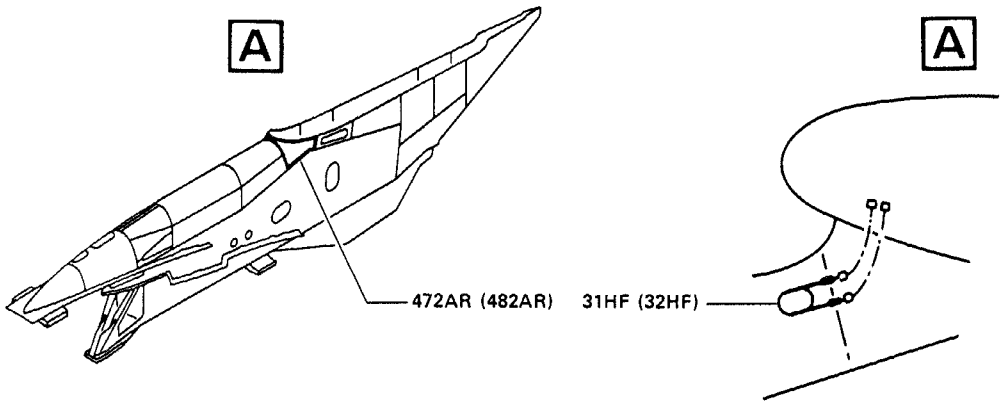
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Overheat Sensing Elements - Location in Wing
Figure 002



Overheat Sensing Elements - Location in Fuselage
Center Section
Figure 003





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Overheat Sensing Elements - Location in APU and Pylon
Figure 004

R C. MID Fuselage Section (FR39 to FR47)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
73HF	SENSING ELEMENT-OVERHEAT		143	147BZ	36-22-12
74HF	SENSING ELEMENT-OVERHEAT		143	147BZ	36-22-12
123HF	SENSING ELEMENT-OVERHEAT		143	147BZ	36-22-12
124HF	SENSING ELEMENT-OVERHEAT		144	147BZ	36-22-12
174HF	SENSING ELEMENT-OVERHEAT		145	811, 831, 131SW, EF, RF, KF	36-22-12
175HF	SENSING ELEMENT-OVERHEAT		145	811, 831 131SW EF, RF, KF	36-22-12
177HF	SENSING ELEMENT-OVERHEAT		143	147BZ	36-22-11
181HF	SENSING ELEMENT-OVERHEAT		143	147BZ	36-22-11

R D. Mid and AFT Fuselage Section (FR54 to FR91)

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
130HF	SENSING ELEMENT-OVERHEAT		145	812, 151FW, AF, YF, WF	36-22-12
132HF	SENSING ELEMENT-OVERHEAT		151	812, 151FW, 151HW	36-22-12
133HF	SENSING ELEMENT-OVERHEAT		151	812, 151HW, 151NW, 151QW, 161BW	36-22-12
134HF	SENSING ELEMENT-OVERHEAT		161	812, 161DW, 161JW, 162AZ	36-22-12
135HF	SENSING ELEMENT-OVERHEAT		171	812, 162AZ	36-22-12
136HF	SENSING ELEMENT-OVERHEAT		171	812, 162AZ	36-22-12
137HF	SENSING ELEMENT-OVERHEAT		311	312AR	36-22-12
138HF	SENSING ELEMENT-OVERHEAT		311	312AR	36-22-12
139HF	SENSING ELEMENT-OVERHEAT		314	316AR	36-22-12

R E. Pylon Section

FIN	FUNCTIONAL DESIGNATION	PANEL	ZONE	ACCESS DOOR	ATA REF.
31HF	SENSING ELEMENT-OVERHEAT		414	472AR	36-22-12
32HF	SENSING ELEMENT-OVERHEAT		424	482AR	36-22-12

3. Description

(Ref. Fig. 005)
(Ref. Fig. 006)

The overheat sensing elements comprise a central lead (nickel wire) embedded in an insulating material and are integrated in an inconel tube connected to aircraft ground.

Each sensing element is permanently subjected to the temperature of the compartment it protects : for any temperature higher than a preset value and applied to a small length of the element, the resistance of the eutectic mixture rapidly decreases and the central lead is grounded ; this results in an overheat signal transmitted from an overheat detection controller which causes illumination of annunciator lights and closing of the valve (s) associated with the affected system. The sensing elements are tied to form a single or double loop. The detection loops are installed in the following aircraft areas :

(Ref. Fig. 005)

A. Engine Pylon Monitoring Area

Each left and right engine pylon is provided with a continuous overheat monitoring system, more particularly located at the outlet of the pylon ventilation duct. (Ref. Fig. 007)

The system is designed as a single loop and the overheat signal is triggered at 204°C ±12°C.

B. Wings and Fuselage Center Section Monitoring Area

The aircraft is divided into two zones, left and right, independently from the sensing element routing through the wings and the fuselage center section. The separation is made at level of the crossfeed valve. (Ref. Fig. 008)

Each zone is provided with a continuous overheat monitoring system comprising twin loops, in order to eliminate spurious warnings.

The overheat signal is triggered at 124°C ±7°C.

The sensing elements are routed :

- through each wing along the front web of the wing spar box.
- through the fuselage center section, in line with orifices drilled in the duct double shroud.

C. Fuselage Aft Section and APU Monitoring Area

Hot air supply system from the APU comprises a single detection loop running from the check valve near the crossfeed duct to the APU compartment (excluding the associated fire zone). (Ref. Fig. 009)

Overheat signal triggered at :

(Td = temperature detection)

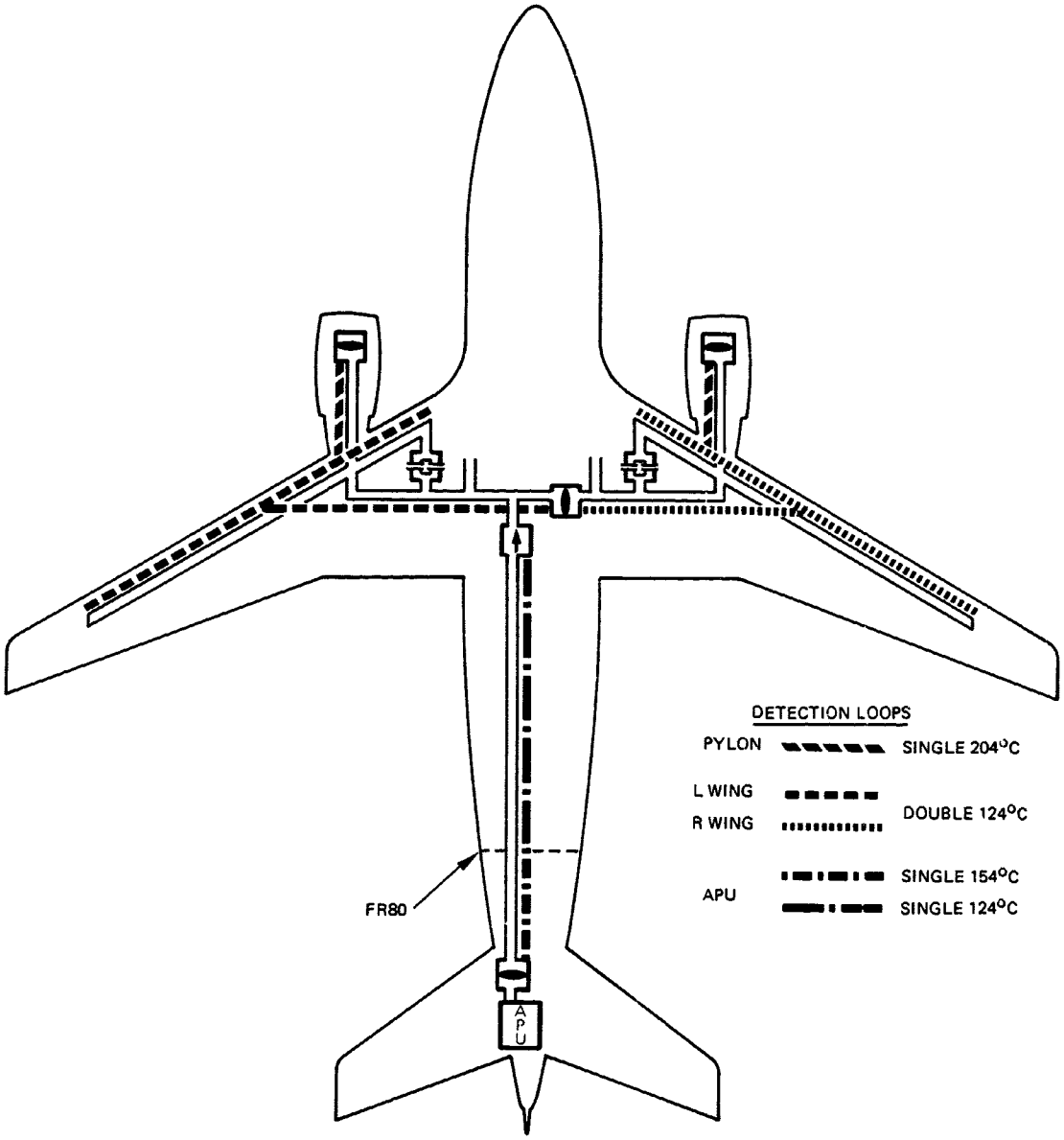
Td = 124°C ±7°C between the check valve and FR80

Td = 154°C ±9°C between FR80 and the APU compartment.

D. Overheat Detection Controllers

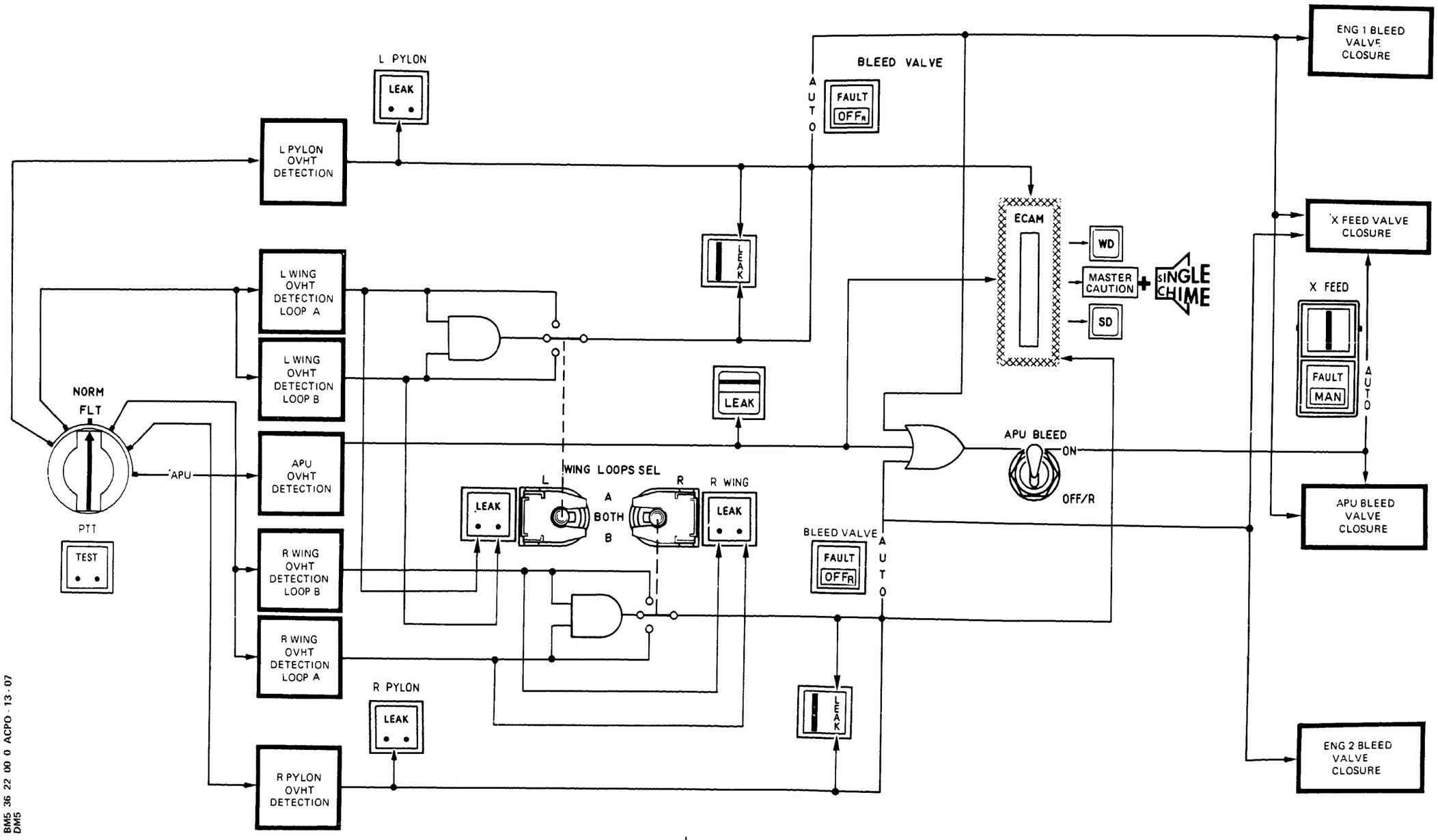
The system comprises two identical controllers located on shelf 91VU (avionics compartment).

The first controller groups on four identical cards the information from the detection loops in the aft fuselage - APU area and right wing and pylon



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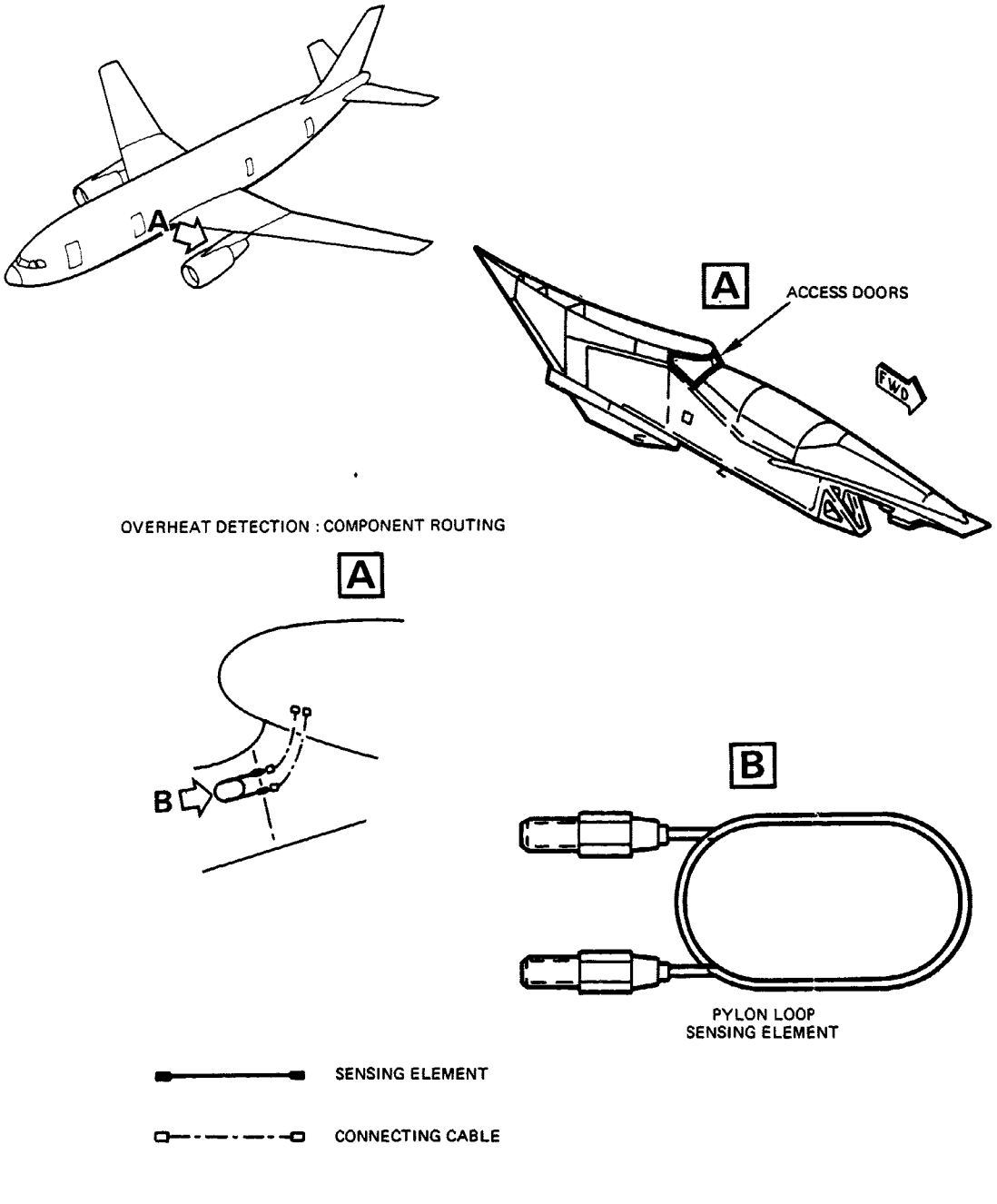
Manifold Air Leak Detection
Figure 005



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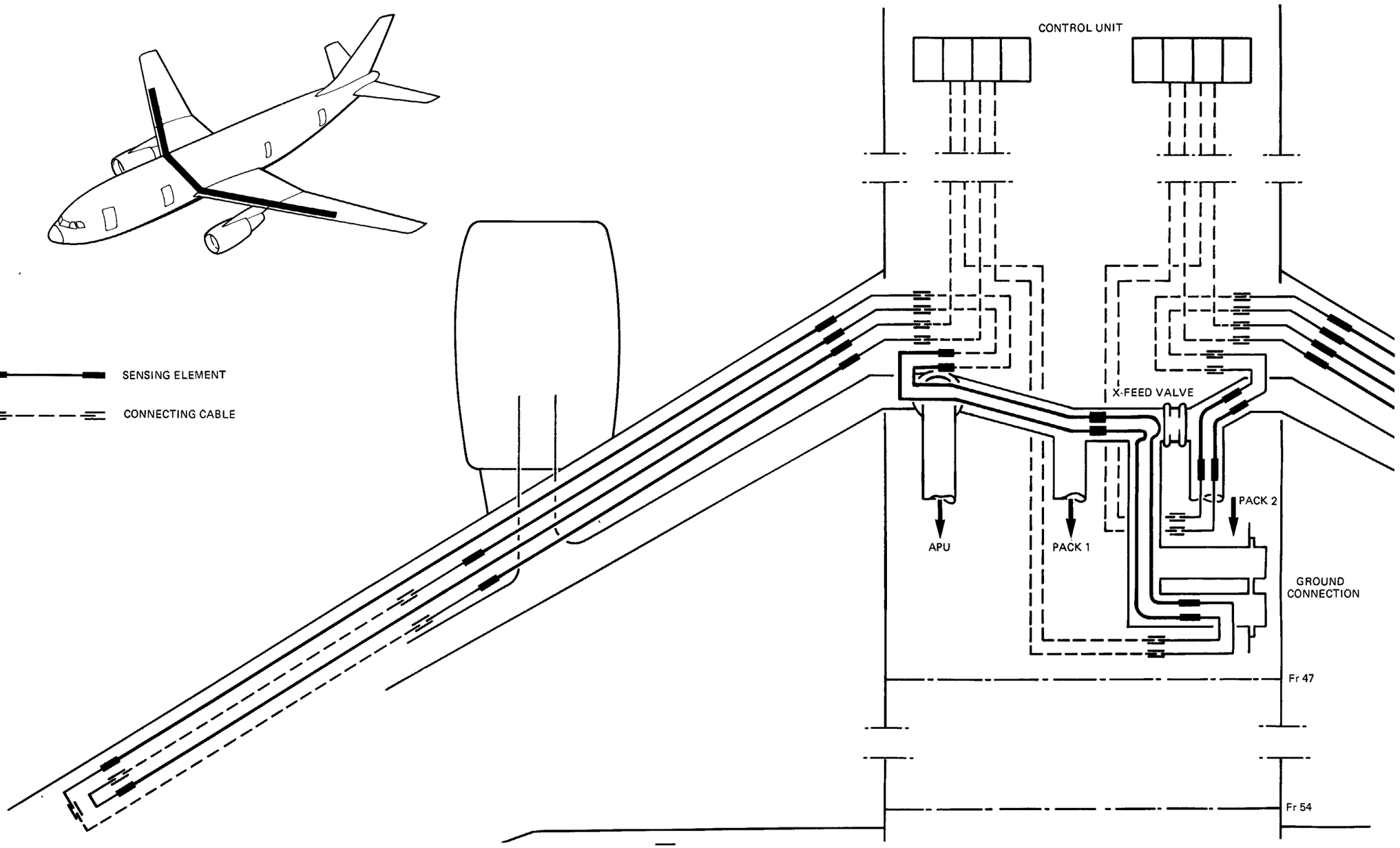
Manifold Air Leak Detection - Schematic
Figure 006

area.
The second controller which is similar to the first one, groups information from the loops in the left wing and pylon area : therefore one of the controller cards is not used.



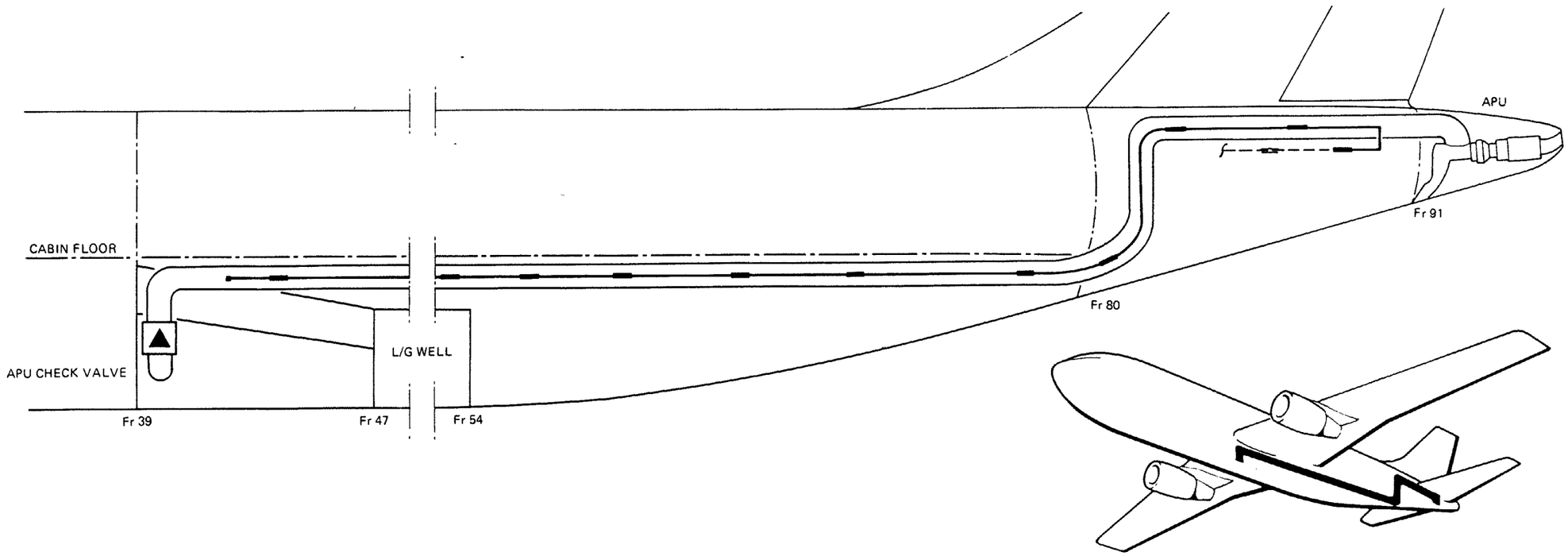
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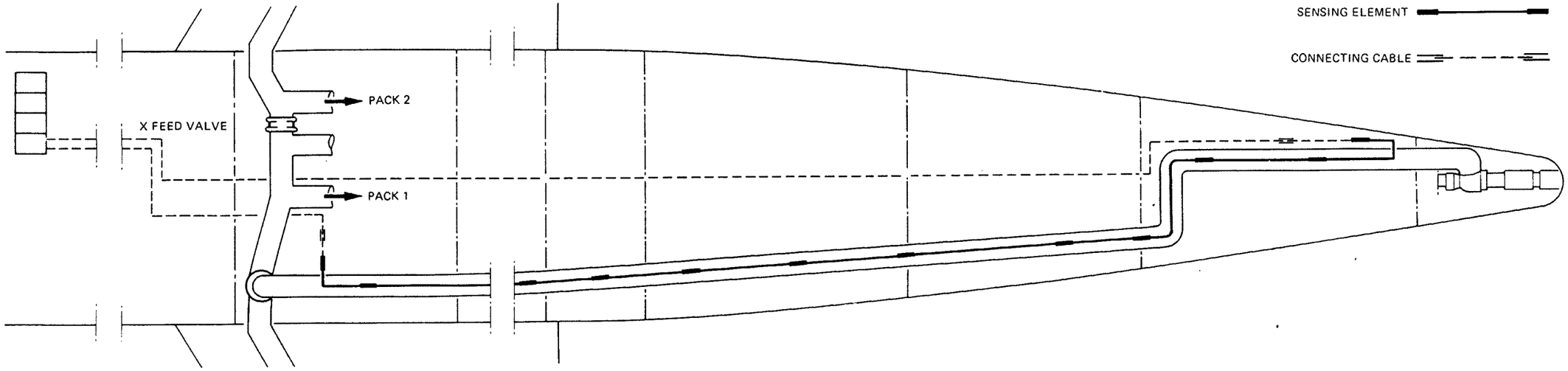
Pylon Overheat Detection
Figure 007



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Wing Overheat Detection
Figure 008





BM5 36 22 00 0 AJMO

Aft Fuselage Overheat Detection
Figure 009

4. Controls and Indicating

A. Operation

(Ref. Fig. 010)

- In the event of overheat, the following warnings are activated :
  . LEAK amber warning legend on the overhead panel with activation of the ECAM system.
  . MASTER CAUTION lights flash on CAPT and F/O main instrument panels 3VU and 5VU if the wing ice protection system is operating.
  . Single chime.
  . On the left ECAM display unit : display of the warning and its associated actions :
  . On the right ECAM display unit : display of the AIR BLEED page (Ref. 36-00-00).

The LEAK legend remains on as long as the overheat condition prevails. But the valves affected by overheat (s) are spring-loaded closed and the circuits must be reset to open the valves when the overheat condition has disappeared.

The various LEAK warnings are the following ones :

- left wing and pylon : LEAK legend of BLEED VALVE/ENG 1 annunciator
- right wing and pylon : LEAK legend of BLEED VALVE/ENG 2 annunciator
- APU : LEAK legend of APU BLEED annunciator

Illumination of LEAK legend of BLEED VALVE/ENG 1 annunciator corresponds to :

. left pylon or wing overheat which results in closing of the associated bleed valve, the wing anti ice valves (if the wing ice protection system is operating) and the APU bleed valve (if the associated switch is in ON position).
  Crossfeed valve closing is confirmed (if the associated pushbutton switch is pressed (in) (AUTO)).

Illumination of LEAK legend of BLEED VALVE/ENG 2 annunciator corresponds to :

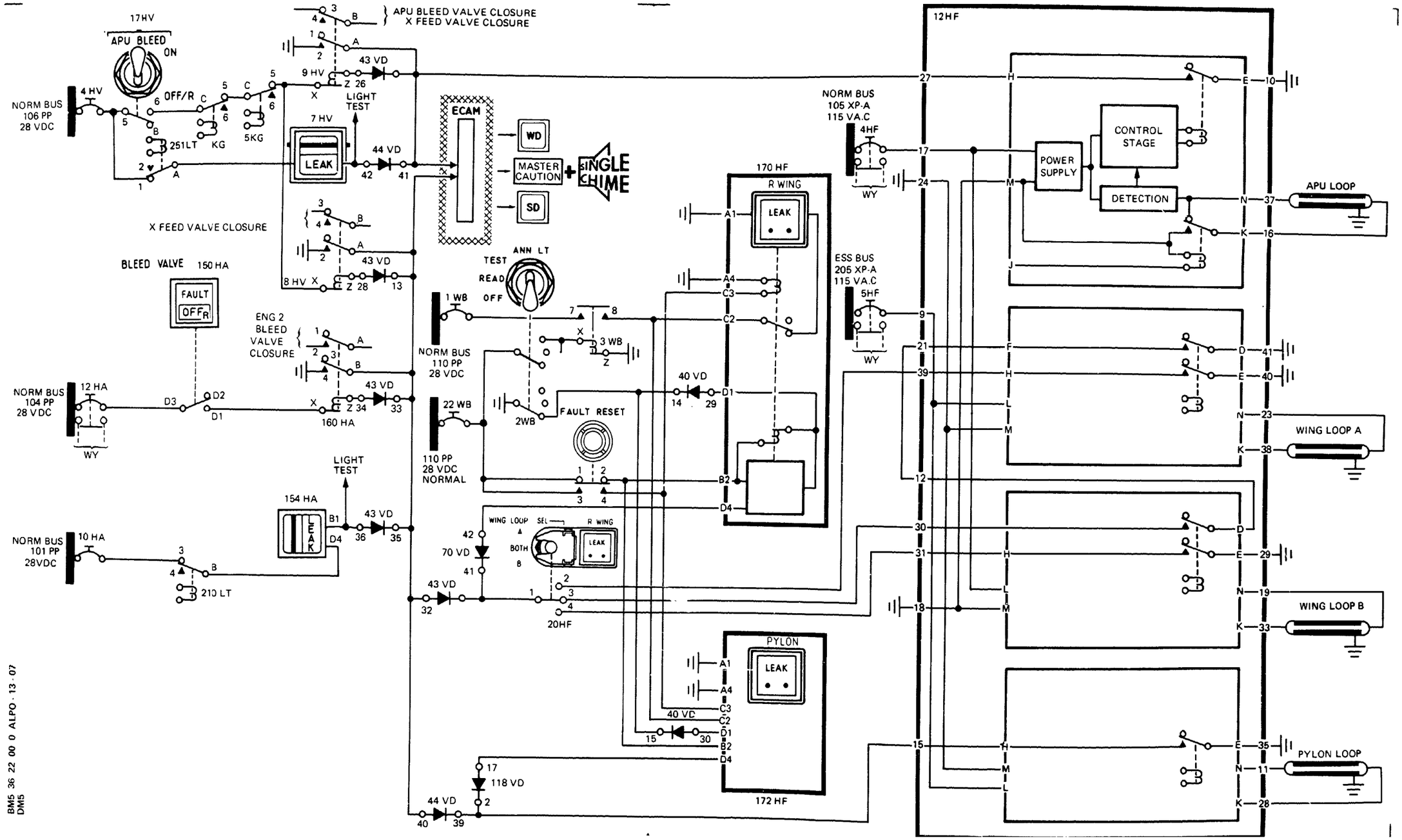
. right pylon or wing overheat which has the same results as the left pylon or wing overheat, except the closure of the APU bleed valve.

Illumination of LEAK legend of APU BLEED annunciator corresponds to :

. Overheat along the fuselage duct, between the APU and the check valve, near the crossfeed duct, which results in :
  - closing of the APU bleed valve (if the associated switch is in ON position). Closing of this valve is inhibited during engine start sequence.
  - closing of the crossfeed valve (if associated pushbutton switch is pressed (in) (AUTO)). Closing of this valve is inhibited during engine start sequence.

Moreover, in the event of pylon or wing overheat, WING/LEAK or PYLON/LEAK memorized fault annunciator (MFA) comes on on the maintenance panel and remains on even after the overheat condition has disappeared ; this facilitates fault isolation after aircraft landing.

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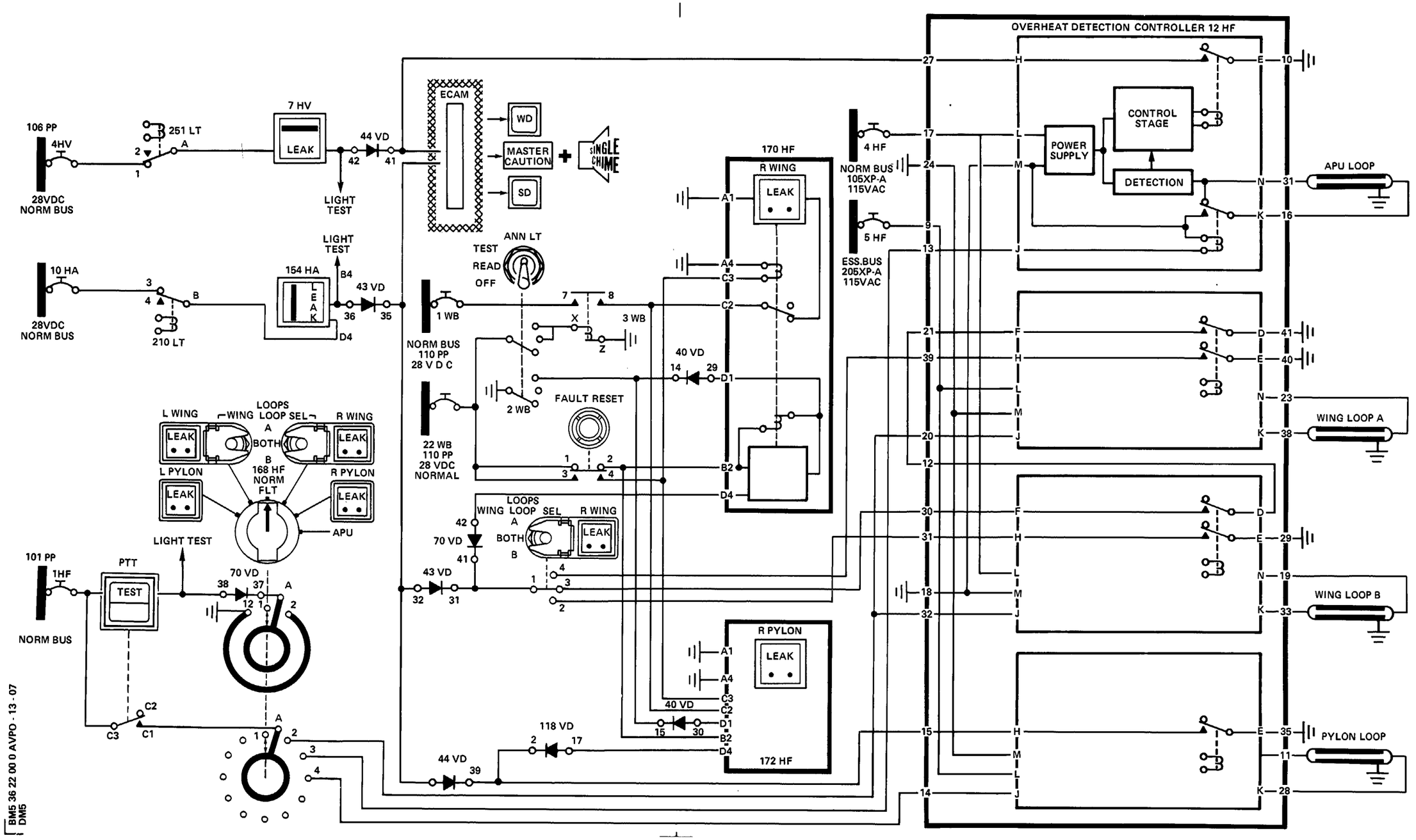


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Manifold Air Leak Detection-Electrical Schematic
Figure 010

B. Ground Test
(Ref. Fig. 011)
The test enables to check continuity of loops, condition of cards in the two overheat detection controllers and operation of the resulting sequences.
The test is performed by means of the loop test selector switch, the **PTT** pushbutton switch and for the left and right twin loops, the three-position **WING LOOP SEL** switch normally locked in **BOTH** position (mid position).

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Manifold Air Leak Detection Test - Electrical Schematic
Figure 011

1. Operational Test

A. Reason for the Job
- Test of indicating circuits.
- Continuity test of loops and associated warning circuits.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure

(1)Job set-up

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.

(c)Make certain that circuit breakers are closed, particularly those associated with **AIR BLEED** and **AIR BLEED & COMPT TEMP.**

(d)On **AIR BLEED** section of panel **436VU**

. press **ENG1** and **ENG2/BLEED VALVE** pushbutton switches : **(AUTO** configuration) Flowbar on **BLEED VALVE** annunciator comes on.

. place **APU BLEED** switch in **ON** position.

(e)On **LOOPS** section of maintenance panel **471VU**

. make certain that L and **R WING LOOP SEL** switches are in **BOTH** position.

(f)On **ECAM** control panel

- press **CLEAR** pushbutton switch until **MASTER WARN** and **MASTER CAUTION** lights go off and **MEMO** page is displayed on L **ECAM** display unit.

R (2)Test of indicating circuits

R ACTION	RESULT
R 1. On maintenance panel 472VU R - place **ANN LT** switch in **TEST** position.	On **LOOPS** section of maintenance panel 471VU and 472VU - all memorized fault annunciators **(MFA)** come on.
R - place **ANN LT** switch in **READ** position.	None.
R 2. On maintenance panel 471VU R - press **MFA RESET** pushbutton switch.	On **LOOPS** section of maintenance panel 471VU - **WING/LEAK MFAs** go off - **PYLON/LEAK MFAs** go off.
R 3. On maintenance panels 470VU and 472VU R - press **MFA RESET** pushbutton switch.	- all memorized fault annunciators go off.

(3)Continuity test of loops and associated warning circuits.

ACTION	RESULT
On LOOPS section of maintenance panel 471VU	
1. Place loop test selector switch in L PYLON position.	On LOOPS section of maintenance panel 471VU - TEST legend on PTT pushbutton switch comes on.
2. Press and release PTT pushbutton switch	- L PYLON/LEAK MFA comes on. On AIR BLEED section of panel 436VU - LEAK legend on ENG1/BLEED VALVE annunciator comes on. - Flowbar on BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On R ECAM display unit - the BLEED page comes into view. On L ECAM display unit the following message is displayed : AIR BLEED 1 LEAK - BLEED VALVE 1-----OFF/R
R	- APU BLEED-----OFF/R Aural warning : single chime.
On AIR BLEED section of panel 436VU	
3. Release ENG1/BLEED VALVE pushbutton switch (OFF/R configuration).	On AIR BLEED section of panel 436VU - OFF/R legend on ENG1/BLEED VALVE pushbutton switch comes on - LEAK legend on ENG1/BLEED VALVE annunciator remains on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on Aural warning : single chime.
4. Place APU BLEED switch in OFF/R position.	On AIR BLEED section of panel 436VU - LEAK legend on ENG1/BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on.
5. Press ENG1/BLEED VALVE pushbutton switch.	On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator comes on.

ACTION	RESULT
	- OFF/R legend on ENG1/BLEED VALVE pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears
On LOOPS section of maintenance panel 471VU	
6. Place loop test selector switch in L WING position.	TEST legend on PTT pushbutton switch remains on.
7. Place L WING LOOP SEL switch in A position.	No change.
8. Place L WING LOOP SEL switch in B position	No change.
9. Place L WING LOOP SEL switch in BOTH position.	No change.
10. Press and release PTT pushbutton switch.	On LOOPS section of maintenance panel 471VU - L WING/LEAK MFA comes on. On AIR BLEED section of panel 436VU - LEAK legend on ENG1/BLEED VALVE annunciator comes on. - Flowbar on BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit, following message is displayed : AIR BLEED 1 LEAK - BLEED VALVE 1-----OFF/R Aural warning : single chime.
On AIR BLEED section of panel 436VU	
11. Release ENG1/BLEED VALVE pushbutton switch (OFF/R).	On AIR BLEED section of panel 436VU - LEAK legend on ENG1/BLEED VALVE annunciator goes off. - OFF/R legend on ENG1/BLEED VALVE pushbutton switch comes on. On CAPT and F/O main instrument panels 3VU and 5VU

ACTION	RESULT
	- MASTER CAUTION lights go off then come on. Aural warning : single chime.
12. Press ENG1/BLEED VALVE pushbutton switch.	On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator comes on. - OFF/R legend on ENG1/BLEED VALVE pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.
13. Place APU BLEED switch in ON position. On LOOPS section of maintenance panel 471VU	None.
14. Place loop test selector switch in R WING position.	TEST legend on PTT pushbutton switch remains on.
15. Place R WING LOOP SEL switch in A position	No change.
16. Place R WING LOOP SEL switch in B position	No change.
17. Place R WING LOOP SEL switch in BOTH position	No change.
18. Press and release PTT pushbutton switch.	On LOOPS section of maintenance panel 471VU - R WING/LEAK MFA comes on. On AIR BLEED section of panel 436VU - LEAK legend on ENG2/BLEED VALVE annunciator comes on. - Flowbar on BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit following message is displayed : AIR BLEED 2 LEAK - BLEED VALVE 2-----OFF/R

R

ACTION	RESULT
	Aural warning : single chime.
On AIR BLEED section of panel 436VU	
19. Release ENG2/BLEED VALVE pushbutton switch (OFF/R)	On AIR BLEED section of panel 436VU - OFF/R legend on ENG2/BLEED VALVE pushbutton switch comes on - LEAK legend on ENG2/BLEED VALVE annunciator remains on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on Aural warning : single chime.
20. Place APU BLEED switch in OFF/R position.	On AIR BLEED section of panel 436VU - LEAK legend on ENG2/BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights remain on.
21. Press ENG2/BLEED VALVE pushbutton switch.	On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator comes on. - OFF/R legend on ENG2/BLEED VALVE pushbutton switch goes off. On CAPT and F/O main instrument panels 3 VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.
On LOOPS section of maintenance panel 471VU	
22. Place loop test selector switch in R PYLON position.	TEST legend on PTT pushbutton switch remains on.
23. Press and release PTT pushbutton switch.	On LOOPS section of maintenance panel 471VU - R PYLON/LEAK MFA comes on. On AIR BLEED section of panel 436VU - LEAK legend on ENG2/BLEED VALVE annunciator comes on. - Flowbar on BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit, following message is displayed :

ACTION	RESULT
	AIR BLEED 2 LEAK - BLEED VALVE 2-----OFF/R Aural warning : single chime.
On AIR BLEED section of panel 436VU 24. Release ENG2/BLEED VALVE pushbutton switch (OFF/R).	On AIR BLEED section of panel 436VU - OFF/R legend on ENG2/BLEED VALVE pushbutton switch comes on. - LEAK legend on ENG2/BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3 VU and 5VU - MASTER CAUTION lights go off then come on. Aural warning : single chime.
25. Press ENG2/BLEED VALVE pushbutton switch.	On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator comes on. - OFF/R legend on ENG2/BLEED VALVE pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears
26. Place APU BLEED switch in ON position.	None.
On LOOPS section of maitenance panel 471VU 27. Place loop test selector switch in APU position.	TEST legend on PTT pushbutton switch remains on.
28. Press and release PTT pushbutton switch	On AIR BLEED section of panel 436VU - LEAK legend on APU BLEED annunciator comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit, following message is displayed : AIR APU BLEED LEAK - APU BLEED-----OFF/R Aural warning : single chime.

ACTION	RESULT
On AIR BLEED section of panel 436VU	
29.Place APU BLEED switch in OFF/R position.	On AIR BLEED section of panel 436VU - LEAK legend on APU BLEED annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit message disappears.
On maintenance panel 471VU	
30.Press and release MFA RESET pushbutton switch.	On LOOPS section of maintenance panel 471VU - L PYLON/LEAK, L WING/LEAK, R WING/LEAK and R PYLON/LEAK MFAs go off.
31.Place loop test selector switch in NORM FLT position.	- TEST legend on PTT pushbutton switch goes off.
On maintenance panel 472VU	
32.Place ANN LT switch in OFF position.	None.

(4)Close-up
  (a)On AIR BLEED section of panel 436VU
    - release ENG1 and ENG2/BLEED VALVE pushbutton switches.
  (b)On ECAM control panel
    - press CLEAR pushbutton switch until MASTER WARN and MASTER CAUTION lights go off and MEMO page is displayed on L ECAM display unit.
  (c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

MANIFOLD AIR LEAK DETECTION - INSPECTION/CHECK

1. Reason for the Job

A. This procedure gives the general description of the leak check on all the bleed air ducts.

2. Equipment and Materials

ITEM	DESIGNATION
A.	Distilled water
B.	Soap solution
R	Foil-aluminium (local purchase)
C. Material No.19-003	Lint-free cotton cloth (Ref. 20-31-00)
R Material No.19-018	Lockwire 0.024 in. dia (0.6 mm dia.)

3. Procedure

A. Job Set-Up

(1)To do leak checks, you can use two air sources :

- Air source from the APU or
- Air source from a ground air supply unit.

Use one of the two sources to do a leak check at the applicable connections.

B. Inspection/Check

R NOTE : There are three methods to do a leak check at the connections
R of the bleed air ducts (duct joint, flexible connections).

R (1)Soap solution method

NOTE : Leaks are permitted if the soap solution stays on the joint line with a continuous series of bubbles. This shows that the leaks are not important.

Leaks are not permitted if the air pressure (from the air source) blows the soap solution off the joint line and prevents a continuous series of bubbles.

R (2)Aluminium foil method

R NOTE : This method is recommended when leak check is performed with
R hot air.

R (a)Wind the foil wrap around the joint one time.

R (b)Twist the seam of the foil wrap tight.

R (c)Make the foil wrap as tight as possible on the tube but do not rip the
R wrap.

R (d)Attach the foil wrap at the two sides of the pneumatic joint with
R lockwire 0.024 in. (0.6 mm) (Material No. 19-018).

R (e)Check that there is no leak :

R 1 If there is a leak, the foil installed on the duct breaks or
R becomes too hot.

R (3)Temperature template method

R NOTE : This method is recommended when leak check is performed with

R hot air and if no leak has been detected with aluminium foil
R method. This method is used to detect smallest leaks.
R (a)Install temperature template along the inspected duct.
R (b)Check the temperature template after next flight to identify areas
R the most hot.

C. Close-Up
(1)Use distilled water to remove all the soap solution from the ducts,
R and dry with Material No. 19-003 or remove the materials used to do
R the leak test.

MANIFOLD AIR LEAK DETECTION - DEACTIVATION/REACTIVATION

R 1. Deactivation Ref. :MEL Sect. 1-36, Item 20 a) (LEAK lt. on AIR BLEED panel)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

A. Reason for the job.
To permit the aircraft dispatch with the common PYLON/WING LEAK light on airbleed panel 436VU inoperative.
NOTE : Only the wing overheat detection is tested, in accordance with MMEL.

B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that circuit breakers are closed, particularly those associated with AIR BLEED and AIR BLEED & COMPT TEMP.
(d)On AIR BLEED section of panel 436VU
- press ENG1 and ENG2/BLEED VALVE pushbutton switches : (AUTO configuration) Flowbar on BLEED VALVE annunciator comes on
- place APU BLEED switch in ON position.
(e)On LOOPS section of maintenance panel 471VU
- make certain that L and R WING LOOP SEL switches are in BOTH position.
(f)On maintenance panel 472VU
- place ANN LT switch in READ position.
(2)Deactivation

ACTION	RESULT
On LOOPS section of maintenance panel 471VU	
1. Place loop test selector switch in L WING position.	TEST legend on PTT pushbutton switch comes on.
2. Press and release PTT pushbutton switch.	On LOOPS section of maintenance panel 471VU - L WING/LEAK MFA comes on. On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU

ACTION	RESULT
	- MASTER CAUTION lights come on. On L ECAM display unit, following message is displayed : AIR BLEED 1 LEAK - BLEED VALVE 1-------OFF/R Aural warning : single chime.
On AIR BLEED section of panel 436VU 3. Release ENG1/BLEED VALVE pushbutton switch (OFF/R).	On AIR BLEED section of panel 436VU - OFF/R legend on ENG1/BLEED VALVE pushbutton switch comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off then come on. Aural warning : single chime.
4. Press ENG1/BLEED VALVE pushbutton switch.	On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator comes on - OFF/R legend on ENG1/BLEED VALVE pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.
On LOOPS section of maintenance panel 471VU 5. Place loop test selector switch in R WING position.	TEST legend on PTT pushbutton switch remains on.
6. Press and release PTT pushbutton switch.	On LOOPS section of maintenance panel 471VU - R WING/LEAK MFA comes on. On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights come on. On L ECAM display unit following message is displayed : AIR BLEED 2 LEAK - BLEED VALVE 2-----OFF/R Aural warning : single chime.

ACTION	RESULT
On AIR BLEED section of panel 436VU 7. Release ENG2/BLEED VALVE pushbutton switch (OFF/R)	On AIR BLEED section of panel 436VU - OFF/R legend on ENG2/BLEED VALVE pushbutton switch comes on. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off then come on. Aural warning : single chime.
8. Press ENG2/BLEED VALVE pushbutton switch.	On AIR BLEED section of panel 436VU - Flowbar on BLEED VALVE annunciator comes on - OFF/R legend on ENG2/BLEED VALVE pushbutton switch goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off. On L ECAM display unit, message disappears.

(3)Close-up
(a)On maintenance panel 472VU
- place ANN LT switch in OFF position.
(b)Install a temporary placard in the flight compartment to warn the flight crew that the PYLON/WING LEAK light is inoperative.
(c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

2. Deactivation Ref. : MEL Sect. 1-36, Item 22 (Wing leak detection loops)
CAUTION : THIS PROCEDURE IS TO BE USED ACCORDING TO THE REQUIREMENTS OF THE MEL.

A. Reason for the Job
To permit the aircraft dispatch with one loop, A or B, inoperative in each wing leading edge.
NOTE : It is supposed that LEAK test with L (R) WING LOOP SEL switch in BOTH position is negative.

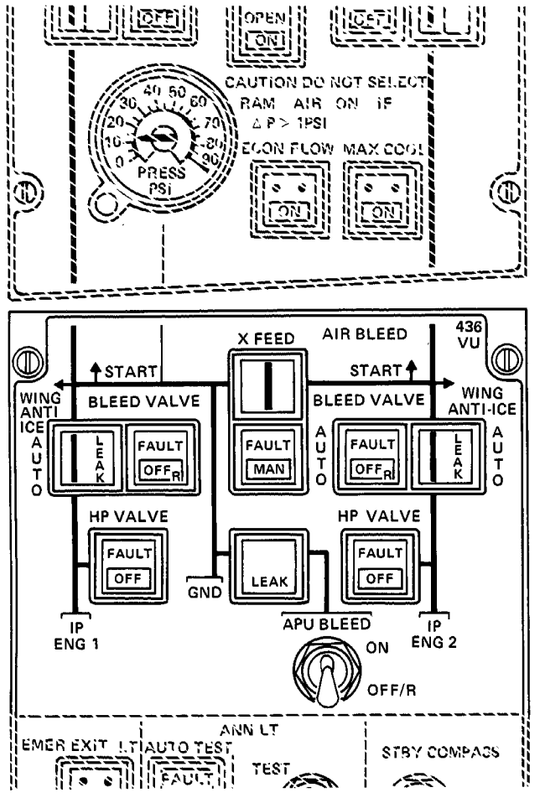
B. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedure - 24-41-00, P. Block 301	AC External Power Control

C. Procedure
(Ref. Fig. 901)
(1)Job set-up

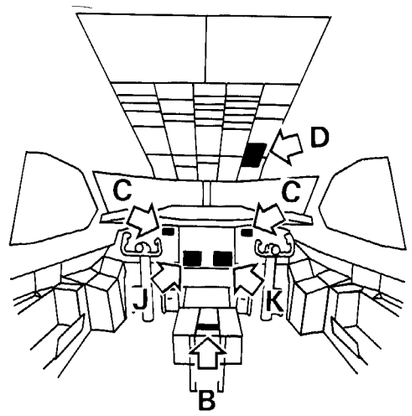
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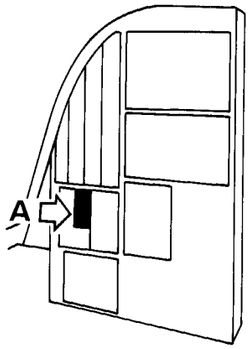
AIR BLEED PANEL

D

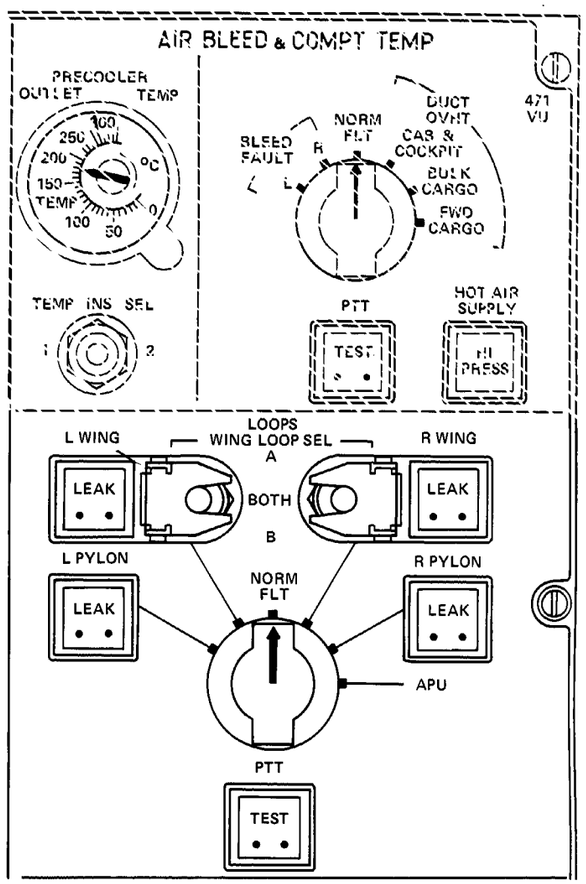


J WARNING DISPLAY

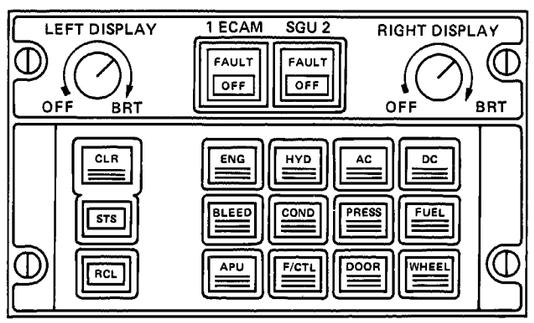
K SYSTEM DISPLAY



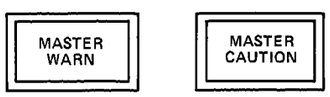
A



B WARNING SYSTEM CONTROL PANEL



C



BM5 36 22 00 9 ACMO - 13 - 07
DM5

AIR BLEED Panel Location
Figure 901

(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).
(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that overhead and rear panel circuit breakers are closed, particulary those associated with **AIR BLEED** and **AIR BLEED & COMPT TEMP** panels 22VU and 131VU.
(d)On **AIR BLEED** section of panel 436VU
. press **BLEED VALVE/ENG 1 (2)** pushbutton switch (**OFF/R** legend off)
. place **APU BLEED** switch in **OFF/R** position.
NOTE : Since the deactivation/reactivation procedures for the left and right wings are identical, only those associated with the left wing are described. For right wing, refer to information between brackets.
(e)On **ECAM** control panel
- press **CLEAR** pushbutton switch until **MASTER WARNING** and **MASTER CAUTION** lights go off and **MEMO** page is displayed on L **ECAM** display unit.

R (f)On maintenance panel 472VU
R - place **ANN LT** switch in **READ** position.

(2)Deactivation

ACTION	RESULT
R	
R 1. On **LOOPS** section of maintenance panel 471VU - place L **(R) WING LOOP SEL** switch in **A** position - place loop test selector switch in L **(R) WING** position - press **PTT** pushbutton switch	On **LOOPS** section of maintenance panel 471VU - **TEST** legend on **PTT** pushbutton switch comes on - L **(R) WING/LEAK** memorized fault annunciator **(MFA)** should come on. On **AIR BLEED** section of panel 436VU - **LEAK** legend on **BLEED VALVE/ENG 1 (2)** annunciator should come on. On **CAPT** and **F/O** main instrument panels 3VU and 5VU - **MASTER CAUTION** lights flash. On L **ECAM** display unit, the following message is displayed - AIR **BLEED 1 (2) LEAK.** Aural warning : single chime.

NOTE : If test is **OK** with L **(R) WING LOOP SEL** switch in **A** position, leave switch in **A** position.

- release **PTT** pushbutton switch.

ACTION	RESULT
R 2. On AIR BLEED section of panel 436VU - release BLEED VALVE/ENG 1 (2) pushbutton switch (OFF/R).	On AIR BLEED section of panel 436VU - OFF/R legend on BLEED VALVE/ENG 1 (2) pushbutton switch comes on - LEAK legend on BLEED VALVE/ENG 1 (2) annunciator goes off. On CAPT and F/O main instrument panels 3VU and 5VU - MASTER CAUTION lights go off On L ECAM display unit - MEMO page is displayed again.
R 3. On maintenance panel 471VU - press MFA RESET pushbutton switch.	On LOOPS section of maintenance panel 471VU - L (R) WING/LEAK MFA goes off.
- release MFA RESET pushbutton switch.	

R

NOTE : If test is not OK with L (R) WING LOOP SEL switch in A position, place and leave switch in B position.

R (3)Close-up
R (a)On maintenance panel 472VU
R - place ANN LT switch in OFF position.
R (b)Install a temporary placard in the flight compartment to warn the flight crew that wing overheat detection loop A (loop B) is inoperative.
R (c)De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

3. Reactivation

A. Equipment and Materials

ITEM	DESIGNATION
Referenced Procedures	
- 24-41-00, P. Block 301	AC External Power Control
- 36-22-00, P. Block 501	Manifold Air Leak Detection

B. Procedure
(1)Job set-up
(a)Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301).

(b)Make certain that electronics racks ventilation is correct.
(c)Make certain that overhead and rear panel circuit breakers are closed, particulary those associated with **AIR BLEED** and **AIR BLEED & COMPT TEMP**.

(2)Reactivation
(a)On **LOOPS** section of maintenance panel **471VU**
- place **L (R) WING LOOP SEL** switch in **BOTH** position.
(b)Trouble shoot the system (Ref. **TSM** section **36-22**).

(3)Test
Perform continuity test of loops and associated warning circuits (Ref. **36-22-00, P. Block 501**).

(4)Close-up
Remove temporary placard.

OVERHEAT DETECTION CONTROLLER - REMOVAL/INSTALLATION

NOTE : Removal/Installation procedures of the two overheat detection controllers (12HF and 13HF) are identical.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Access Platform
B.	Circuit Breaker Safety Clips
Referenced Procedure - 36-22-00, P. Block 501	Manifold Air Leak Detection

2. Procedure

A. Job Set-Up
(1)Open, safety and tag the following circuit breakers : (Ref. Fig. 401)

PANEL	SERVICE	IDENT.	LOCATION
131VU	LEAK DET LOOPS/L & APU PYLON & B	4HF	311/H51
131VU	LEAK DET LOOPS/R PYLON & A	5HF	312/G51
131VU	LEAK DET LOOPS/TEST	1HF	312/G52
131VU	AIR BLEED & COMPT TEMP/ENG2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/VALVES/APU BLEED CTL & WARN	4HV	312/G55

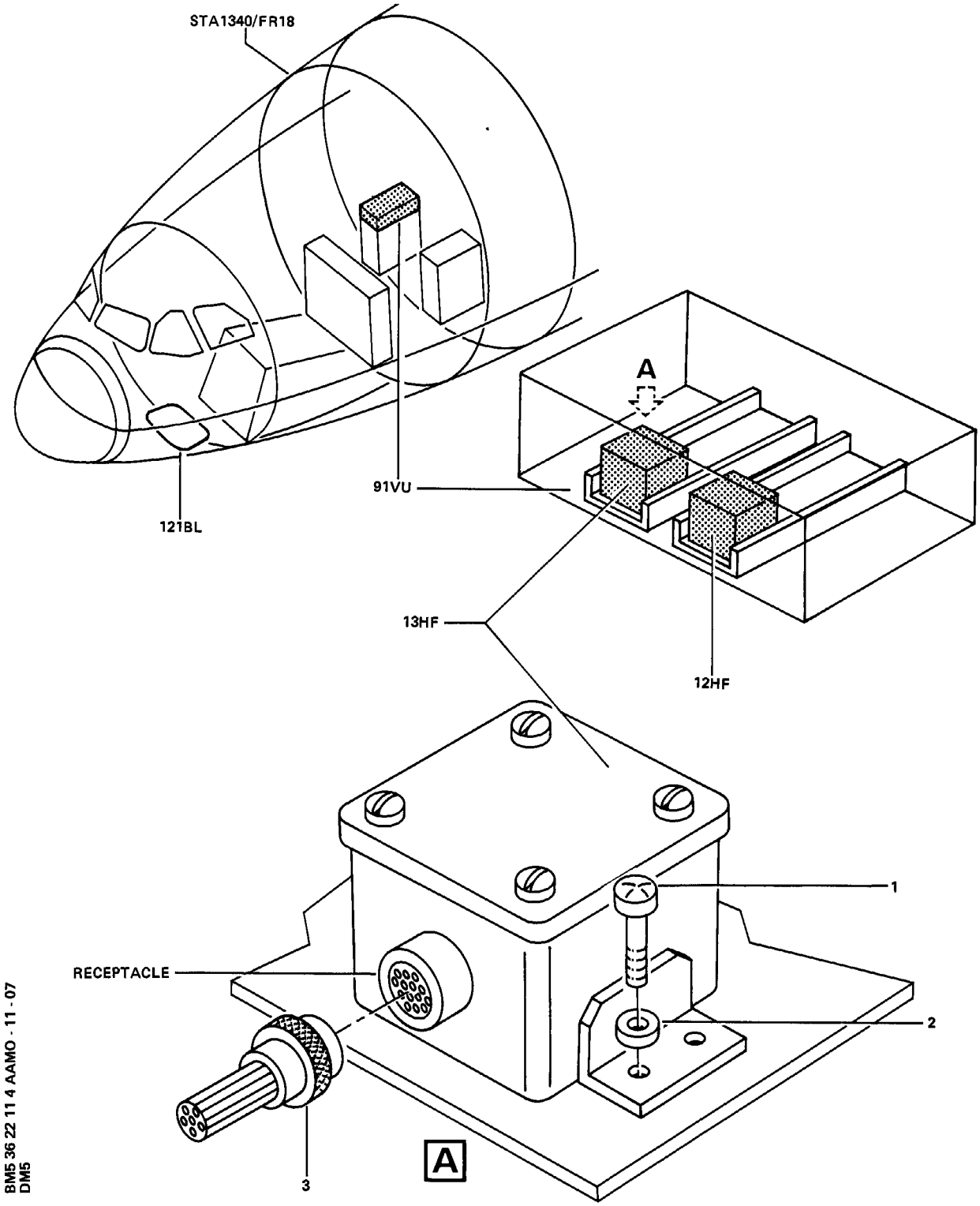
(2)Position access platform.
(3)Open door 121BL for access to avionics compartment.

B. Removal
(1)Disconnect electrical connector (3).
(2)Remove the four bolts (1) and washers (2).
(3)Remove controller

C. Installation
(1)Install controller on mount
(2)Install the four bolts (1) with washers (2).
(3)Connect electrical connector (3).
(4)Remove safety clips and tags and close circuit breakers 1HF, 4HF, 5HF, 4HV and 10HA.

D. Test
R Perform operational test (Ref. 36-22-00, P. Block 501).

E. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access door 121BL.
(3)Remove access platform.



Overheat Detection Controller 12HF (13HF)
Figure 401

OVERHEAT SENSING ELEMENT - REMOVAL/INSTALLATION

NOTE : Removal/Installation procedures for the various sensing elements composing the overheat detection system are identical.
- Engine pylons : single loop 204°C
- Wings : twin loops 124°C
- Forward fuselage : single loop 124°C
- Aft fuselage : single loop 154°C.

1. Equipment and Materials

ITEM	DESIGNATION
A.	Circuit Breaker Safety Clips
B.	Blanking caps
C.	Corrosion - Resistant Steel Lockwire Dia. 0.5 mm
D.	Torque Wrench 0.56 - 0.84 m. daN (50 - 75 lbf. in.)
E.	Access Platform
F. Material No. 11-022	Cleaning Agents (Ref. 20-31-00)
Referenced Procedures	
R - 30-00-00, P. Block 401	Ice and Rain Protection
- 36-11-00, P. Block 401	Engine Bleed Air Supply System
- 36-22-00, P. Block 1	Manifold Air Leak Detection
- 36-22-00, P. Block 501	Manifold Air Leak Detection

2. Procedure

A. Job Set-Up

(1)Open, safety and tag the following circuit breakers :

PANEL	SERVICE	IDENT.	LOCATION
131VU	LEAK DET LOOPS/L & APU PYLON & B	4HE	311/H51
131VU	LEAK DET LOOPS/R PYLON & A	5HF	312/G51
131VU	LEAK DET LOOPS/TEST	1HF	312/G52
131VU	AIR BLEED & COMPT TEMP/ENG2/WARN	10HA	312/G54
131VU	AIR BLEED & COMPT TEMP/VALVES/APU BLEED CTL & WARN	4HV	312/G55

(2)Gain access to sensing element.

NOTE : For access doors corresponding to sensing element to be removed, refer to 36-22-00, P. Block 1.

(3)For removal of sensing elements located at pylon-to-wing forward attach fitting.

(a)Remove shield and de-icing system hot air ducts located between wing
R ribs 6 and 8 (Ref. 30-00-00, P. Block 401).

(b)Remove pylon-to-wing junction elbow from air bleed duct (Ref. 36-11-00, P. Block 401).

B. Removal

CAUTION : REMOVE OR INSTALL THE SENSING ELEMENTS CAREFULLY. DO NOT TWIST, BEND OR CAUSE KINKS IN THE SENSING ELEMENTS.

(Ref. Fig. 401)

(1)On each connector of sensing element to be removed, cut and remove lockwire and loosen union nut (3).

(2)On plug connector of sensing element to be removed, cut and remove lockwire and remove retaining nut (2) securing sensing element to mounting lug (1).

(3)Loosen camlocs (5) and open clamps (6) in order to free grommets (4) which are placed at intervals along the whole length of sensing element to support it.

(4)Remove sensing element and retain grommets (4).

R (5)Install blanking caps on the disconnected electrical connectors.

C. Preparation of Replacement Component

R (1)Cleaning

R WARNING : CLEANING SOLVENTS ARE FLAMMABLE, VOLATILE, TOXIC. THEY SHOULD BE USED WITH ADEQUATE VENTILATION. AVOID PROLONGED BREATHING OF VAPORS AND REPEATED OR PROLONGED CONTACT WITH THE SKIN, OR CLOTHING.

R WARNING : DO NOT EXCEED THE PRESSURE RECOMMENDED AT THE NOZZLE WHEN USING COMPRESSED AIR OR NITROGEN IN THIS CLEANING PROCESS. ALSO WEAR STURDY GOGGLES OR A FACE SHIELD. PARTICLES OR LIQUID DROPLETS PROPELLED BY HIGH PRESSURE CAN CAUSE PERMANENT EYE INJURY.

R CAUTION : USE ONLY THE SPECIFIED MATERIALS AND OBEY THE INSTRUCTIONS FROM THE MANUFACTURERS. OTHER MATERIALS CAN CAUSE DAMAGE TO THE SURFACE PROTECTION OF THE COMPONENTS AND THE RELATED AREA.

R NOTE : The pressure recommended is 30 psi (2.1 bars).

R (a)Remove the blanking caps from the disconnected electrical connectors.

R (b)Apply the CLEANING AGENTS (Material No. 11-022) with a spray gun :

R - on the end fittings of the sensing elements, of the cable assemblies and of all other connectors

R - into the receptacles of the connectors, where necessary, to flush them.

R NOTE : Do not use probes, swabs or any other instrument to explore in the ends of the connectors when cleaning them.

R (c)Rinse and dry all parts of the sensing elements.

R (d)Dry all the components with a compressed air : 25 to 30 psi (1.75 to 2.1 bars) at a pressure of not more than 21 bars (30 psi).

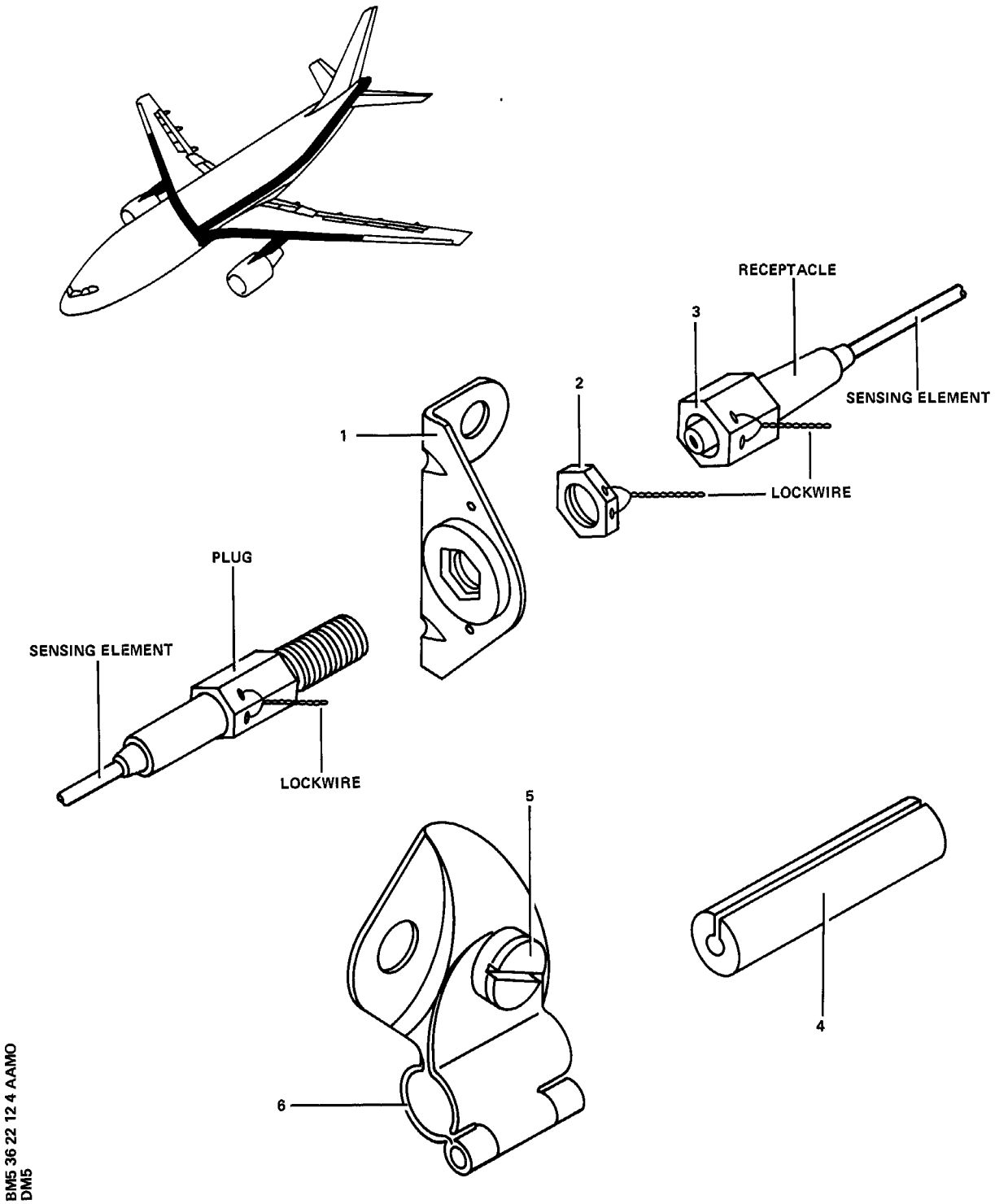
R NOTE : Normal compressed air contains contaminants that could cause electrical shorting in the connectors.
Therefore it is important that only clean, dry air or nitrogen be used when blowing out the connectors.

R (e)Install the blanking caps on the disconnected electrical connectors.

R (2)Inspection

R (a)Check over whole length that the sensing element is not nicked or flattened, which could reduce its initial diameter 0.05 mm (0.002 in.).

R (b)Check for correct condition of connector threaded sections. Make certain that center pin of connector is free from corrosion, distortion, dirt or contamination.



Ambient Overheat Detection Loop
Figure 401

(c)Check for correct condition of camlocs. Make certain that they are properly attached to the structure and can be correctly locked.
(d)Install grommets retained from removed sensing element on replacement component.

D. Installation
(1)Remove the blanking caps and install sensing element following strictly the existing routing.
(2)Correctly install each grommet (4) on its clamp (6). Close clamps and tighten camlocs.
(3)TORQUE to between 0.56 and 0.84 m. daN (50 and 75 lbf. in.) and wirelock retaining nut (2) of sensing element to mounting lug (1).
(4)On each sensing element connector, TORQUE union nut (3) to between 0.56 and 0.84 m. daN (50 and 75 lbf. in.) and wirelock.
(5)Remove safety clips and tags and close circuit breakers 4HV, 10HA, 5HF, 4HF and 1HF.

E. Test
(1)Perform operational test corresponding to removed sensing element (Ref. 36-22-00, P. Block 501).

F. Close-Up
(1)Make certain that working area is clean and clear of tools and miscellaneous items of equipment.
(2)Close access doors.
R CAUTION : MAKE SURE THAT ALL THE FASTENERS AND PIP PINS ARE CORRECTLY
R INSTALLED AND SECURED WHEN YOU INSTALL/CLOSE THE ACCESS
R DOORS/PANELS AT FR47.
R (a)Close access doors corresponding to sensing element.
(3)Remove access platform.